

7. *South African Pycnogonida*. By K. H. BARNARD, D.Sc., F.L.S. (With 34 text-figures.)

This paper is the result of an examination of the South African Museum material comprising mainly the collection made by the Cape Government trawler s.s. *Pieter Faure*, together with a moderate number of specimens obtained from time to time by shore-collecting.

The history of our knowledge of South African Pycnogonids has been given by Flynn (1928). Gordon (1932) has redescribed three species from the type material. Since then Helfer (1937), Barnard (1946) and Stock (1951) have described material from South Africa south of lat. 15° S.

Flynn (1928) gave a list of the then-known South African species, including a Mozambique record. The list omits *Parapallene nierstraszi* which Flynn himself records in his paper; but on the other hand it includes *Pallenopsis crosslandi* which neither Flynn nor any other author has recorded from South Africa. Not counting '*Pallenopsis sp. Loman*' (1923) the list contains thirty-six species.

A second paper by Loman, also published in 1923, and containing two new records (one from Angola), was not mentioned by Flynn. In 1937 Helfer described three new genera and species; in 1946 Barnard one new genus and ten new species; and in 1951 Stock one new genus and two new species. In the present paper three of Loman's species and records, one of Flynn's species, and one of Helfer's are regarded as synonyms. The list is appreciably longer than Flynn's, and contains fifty-three species.

All the accepted families are represented in the fauna. Of the newly recorded constituents it is interesting to note the occurrence of the genera *Pipetta* and *Austroraptus*. The genus *Queubus* Brnrd., of uncertain affinities, is placed near but not in the family *Pycnogonidae*.

No examples of 'extra-legged' (10 or 12 pairs) species have been found in South African waters. These remarkable Pycnogonids are mostly inhabitants of the Antarctic, though examples have also been found in the Caribbean Sea (see: Hedgpeth, 1947, *Smiths. Misc. Coll.*, cvi, pp. 9 sqq.).

The early stages of some species are parasitic in the zooids of Hydroids, causing the formation of galls. An example from South Africa has been noted by Warren (1908, *Ann. Natal Mus.*, i, p. 293) and referred to by Flynn (1928, p. 5).

Collectors and others should be warned against the use of cotton wool as a plug in tubes or bottles to prevent shaking while in transit, because no other animals, not even Crustacea, seem to get their claws so inextricably entangled

in it. A plug of soft paper should be interposed between the animals and the cotton-wool plug in a tube.

List of South African Species

Colossendeidae

- Colossendeis colossea* Wilson
 „ *macerrima* Wilson
Pipetta capensis Brnrdr.
Rhopalorhynchus kröyeri Wood-Mason

Nymphonidae

- Nymphon capense* Hodgson ? = *phasmatodes* Böhm
 „ *australe* Hodgson
 „ *signatum* Möbius
 „ *distensum* Möbius
 „ *pilosum* Möbius syn. *bipunctatum* Flynn
 „ *comes* Flynn
 „ *affinis* Stock
 „ *natalense* Flynn
 „ *microctenatus* Brnrdr.
 „ *crenatiunguis* Brnrdr.
 „ *setimanus* Brnrdr.

Pallenidae

- Callipallene* sp.
Pseudopallene gilchristi Flynn
Parapallene spinosus (Möbius)
 „ *nierstraszi* Loman
 „ *calmani* Flynn
 „ *hodgsoni* Brnrdr.
 „ *algoae* Brnrdr.
Metapallene dubitans (Hodgson) syn. *Procidella gibber* Helfer
Pallenoides magnicollis Stock
Pallenopsis oscitans (Hoek)
 „ *brevidigitata* Möbius
 „ *intermedia* Flynn syn. *Pallenopsis* sp. Loman, 1923, *P. fluminensis*
 Loman, 1923, non Kröyer
 „ *capensis* Brnrdr.
 „ (*Rigona*) *crosslandi* Carp.*
 „ „ *ovalis* Loman
Hannonia typica Hoek

* See p. 116.

Phoxochilidiidae

- Phoxochilidium capense* Flynn
Anoplodactylus aculeatus Möbius
 „ *pelagicus* Flynn
 'Pallene' *lappa* Böhm

Endeidae

- Endeis clipeatus* (Möbius)
 „ *mollis* (Carp.)

Ammotheidae

- Böhmia chelata* (Böhm)
 „ *tuberosa* Möbius
Achelia quadridentata (Hodgson)
 „ *brevicauda* (Loman)
Nymphopsis cuspidata (Hodgson) syn. *abstrusus* Loman
Kyphomia setacea Helfer ? *Ammothella setacea*
Ascorhynchus ornatum (Helfer)
Austroraptus thermophilus Brnrd.

Tanystylidae

- Tanystylum ornatum* Flynn
Discoarachne brevipes Hoek

Pycnogonidae

- Pycnogonum cataphractum* Möbius
 „ *forte* Flynn
 „ *microps* Loman
 „ *portus* Brnrd.
 „ *pusillum* Dohrn

Incertae sedis

- Queubus jamesanus* Brnrd.

Key to the South African Families

- I. Body extended, crurigers distinctly separated (except *Pallenopsis* subg. *Rigona*, where they are contiguous). Proboscis directed forward (except *Hannonia*).
- A. No chelifers (in adult). No auxiliary claws. *Colossendeidae*
- B. Chelifers present.
1. Ovigiers present in both sexes, with compound spines (fig. 3*d*).
 Ocular tubercle not, or not far, in front of 1st crurigers.
- a. Palps present, 5-jointed. *Nymphonidae*
- b. Palps absent, or knob-like, or 3-4-jointed. *Pallenidae*
2. Ovigiers present in ♂ only, with simple spines. *Phoxochilidiidae*
- C. Chelifers and palps absent. Auxiliary claws present. *Endeidae*
- II. Body more or less compact, segmented or the segmentation suppressed, crurigers usually narrowly separated. Proboscis directed forwards, or more or less downwards, or bent under body.

- A. Palps present. Ovigera present in both sexes, without apical claw.
 1. Palps 6-10-jointed. *Ammotheidae*
 2. Palps 4-6-jointed *Tanystylidae*
- B. Palps absent. Ovigera sometimes present in ♂ only, with apical claw *Pycnogonidae*

Fam. COLOSSENDEIDAE

1908. Loman, *Siboga Exp. monogr.*, xl, p. 21 and conspectus facing p. 19
 (subfam. *Colossendeinae*.)
1913. Schimkewitsch, *Zool. Anz.*, xli, p. 614.
1913. Bouvier, *2me Exp. Antarct. Franc.*, p. 37.
1933. Calman and Gordon, *Proc. Roy. Soc. Lond.*, B, cxiii, p. 113.

Legs 8-12. Body of 4-6 segments, fused or free. Proboscis large, immovable. Chelifers absent (usually) in adult. Palps long, usually 8-10-jointed, arising from knob-like processes. Ovigera in both sexes, arising from knob-like processes, 10-jointed, with apical claw, last 4 joints with non-serrate (usually) spines. Bases of palps and ovigera approximate or contiguous. Legs long, tarsus usually of fair length, tarsus and propodus unarmed or not armed with strong spines, without auxiliary claws. Genital apertures on all legs (2nd coxal joint) in both sexes.

Key to the South African Genera

Octopodous

1. Body segments fused. Crurigers not widely separated. Very large species. *Colossendeis*
2. Body segmented. Crurigers widely separated.
- a. Abdomen elongate. 2nd coxa longer than 1st or 3rd. *Pipetta*
- b. Abdomen minute. All three coxae subequal *Rhopalorhynchus*

Gen. *Colossendeis* Jarzinsky

1881. Hoek, *Rep. H.M.S. 'Challenger'*, iii, pp. 28, 61.
1913. Bouvier, loc. cit., p. 53.
1917. id., *Res. Sci. Camp. Monaco*, fasc. 51, p. 7.
1932. Gordon, '*Discovery*' *Rep.*, vi, p. 11.
1938. id., *Austral. Antarct. Exp.*, C, II, 8, p. 7.
1944. id., *B.A.N.Z. Antarct. Exp.*, B, v, pt. 1, p. 9.

Octopodous. Proboscis more or less evenly cylindrical, or constricted basally.

Key to the South African Species

Last 3 joints of the legs together much shorter than two-thirds length of 2nd tibial joint (brevitarsal group).

1. Proboscis stout, constricted basally. Palps much longer than proboscis, 4th joint shorter than 2nd. *colossea*
2. Proboscis slender, evenly cylindrical. Palps a little longer than proboscis, 4th joint longer than 2nd. *macerrima*

Colossendeis colossea Wilson

1881. Wilson, *Bull. Mus. Comp. Zool. Harv.*, viii, p. 244, pl. 1, fig. 1., pl. 3, figs. 5-7.
 1881. Hoek, loc. cit., pp. 61, 147, pl. 8, figs. 1, 2, pl. 10, figs. 1-5 (*gigas*).
 1917. Bouvier, loc. cit., p. 13, pl. 1, fig. 2, pl. 2, fig. 1 (coloured) (references).
 1923. Calman, *Rec. Ind. Mus.*, xxv, p. 266.
 1928. Flynn, *Fish. Mar. Biol. Surv. Rep.*, vi, Spec. Rep. 1, p. 7.
 1944. Gordon, loc. cit., p. 11.
 1953. Stock, *Temminckia*, ix, p. 311.

Proboscis stout, constricted in basal third. Palp much longer than proboscis, 4th joint shorter than 2nd, 6th about twice as long as 5th; 7th, 8th and 9th subequal. Femur of legs subequal to 1st tibia, much longer than 2nd tibia.

Length of body (excl. proboscis) 21 mm., proboscis 33 mm., legs 240 mm. (Hoek: 32.5, 47.5 and 301 mm. resp.). Reddish (see Bouvier's coloured figure).

Localities: off Cape Point, 660-755 fathoms (Flynn); off Cape Point, 650-1,000 fath. (S. Afr. Mus.); off Gneka River, 43 fath., and 29° 44' S. 31° 20' E., 46 fath. (Flynn).

Distribution. Southern Indian Ocean, East Indian Sea, off west coast of South America, Japan, North and Central Atlantic.

Colossendeis macerrima Wilson

1881. Wilson, loc. cit., p. 246, pl. 1, fig. 2, pl. 3, figs. 9-12, pl. 5, fig. 32.
 1881. Hoek, loc. cit., pp. 64, 147, pl. 8, figs. 3-7 (*leptorhynchus*)
 1917. Bouvier, loc. cit., p. 10, pl. 1, fig. 1 (coloured), pl. 3, figs. 1, 2.
 1923. Calman, loc. cit., p. 267.
 1928. Flynn, loc. cit., p. 7 (*macerrime*, and p. 6 *macerrima*, typ. err.).
 1953. Stock, *Temminckia*, ix, p. 307, fig 17 *e-h*.

Proboscis slender, nearly evenly cylindrical, often slightly upturned in distal third. Palps only a little longer than proboscis, 4th joint much longer than 2nd, 5th and 6th subequal, 7th and 8th subequal, 9th usually a little longer than 8th. Femur of legs subequal to 1st tibia, much longer than 2nd tibia.

Length: body 17 mm., proboscis 34 mm., legs 155 mm. Reddish.

Localities: off Cape Point, 660 fath. (Flynn); off Cape Point, 700-800 fath. (S. Afr. Mus.); off Gneka River, 43 fath. (Flynn).

Distribution. As for *colossea*.

Remarks. Much less abundant than *colossea* in Cape waters.

Flynn has remarked that the shallow-water records of both species need confirmation. Gneka* River is about midway between Keiskamma Point and East London.

* Spelt Nieca in the s.s. Pieter Faure log-books and Rep. Gov. Biologist 1901 chart; Ncera on sheet 5 of the topographical map issued by the Irrigation Dept. 1939; also sheet SE 35/24 Port Elizabeth, 1:500,000. 1950.

Gen. *Pipetta* Loman

1904. Loman, *Tijdschr. Ned. Dierk. Ver.* (2) viii, p. 264.
 1908. id., loc. cit., p. 27.
 1914. Hodgson, *Zool. Anz.*, xlv, p. 159.
 1915. id., *Ann. Mag. Nat. Hist.* (8) xv, p. 141 (English version of 1914 paper).
 1927. id., *D. Südpol. Exp.*, xix (zool. xi), p. 314.

Octopodous. Body segmented, very slender. Crurigers slender, very widely separated. Ocular tubercle conical, no eyes. Proboscis elongate, very slender. Abdomen elongate, slender. Palps slender, 8-jointed. Ovigera 10-jointed, with small apical claw. Legs slender, no auxiliary claws.

Two species hitherto known: *P. weberi* Loman 1904 from the East Indies, 2,081 metres; and *P. australis* Hodgson 1914 from the Antarctic ('Gauss' winter quarters), 2,450 metres.

Calman and Gordon (1933, loc. cit., p. 114) exclude this genus from the *Colossendeidae*; Hedgpeth (1947, *Smiths. Misc. Coll.*, cvi, p. 5) includes it with a question mark.

Pipetta capensis Brnrd.

Fig. 1

1946. Barnard, *Ann. Mag. Nat. Hist.* (xi) 13, p. 60.

Body rod-like, slender, with scattered microscopic granules. Crurigers separated by increasingly wide intervals, the 2nd pair slightly the longest, 4th pair shortest; 1st with a low conical elevation on dorsal apex, 2nd-4th each with a strong upstanding spiniform process. Ocular tubercle high, slender, conical, no eyes. Proboscis proximally slightly swollen, distally very slender. Palps slightly longer than proboscis, 1st joint short, swollen, 2nd longest, apically swollen, with a few setae, 4th long, about two-thirds length of 2nd, with a few setae, 3 spine-setae and a longer one on apex, 5th-8th joints short, sparsely setose. Oviger 1st joint short, swollen, 2nd a little more than twice the 3rd, 4th one and a half times the 2nd, 5th short, 6th longest, apically clavate, 7th-10th joints short, more or less swollen, each with a few (2-4) blunt denticles on inner margins, apical claw small.

Legs very slender, 3rd coxa with a strong upstanding slender spiniform process; femur with a few long setae and a spine-seta on dorsal apex; 1st tibia slightly shorter than femur, 2nd tibia slightly shorter than 1st tibia, both with scattered setae; tarsus about half length of propodus, the latter slender, slightly curved, with fine setae on lower margin, claw feebly denticulate on lower margin.

Body, tip of proboscis to tip of abdomen, about 7.5 mm. (specimen broken in half); proboscis 3.5 mm., abdomen 1.75 mm., femur 2 mm., 1st tibia 1.75 mm., 2nd tibia 1.5 mm.

Locality: off Cape Point, N. 81° E. 32 miles, 460 fath. 1 specimen (S. Afr. Mus.).

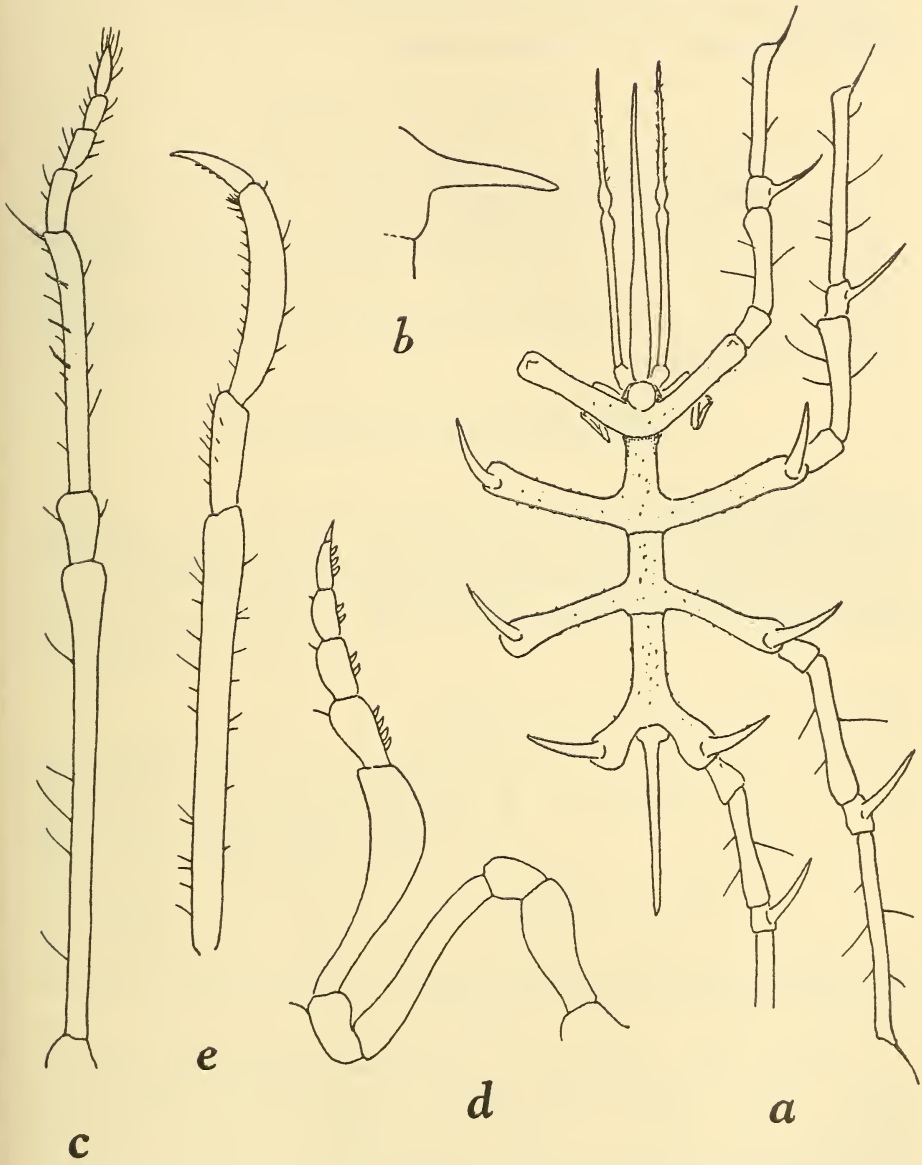


Fig. 1. *Pipetta capensis* Brnrd. a. dorsal view. b. lateral view of ocular tubercle, from left side. c. palp. d. oviger. e. 2nd tibia, tarsus and propodus of leg.

Remarks. Resembles *weberi* in having the tarsi long proportionately to the propodi (not very short as in *australis*), but differing from both species in having spiniform processes on the 2nd-4th crurigers.

Gen. *Rhopalorhynchus* Wood-Mason

1873. Wood-Mason, *J. Asiat. Soc. Beng.*, xlii, p. 171.

1908. Loman, loc. cit., p. 23.

Octopodous. Body segmented, slender, rod-like. Crurigers short, stout, widely separated. Ocular tubercle short, conical, eyes present. Proboscis elongate, fusiform. Abdomen very short. Palps slender, 9-jointed. Ovigera slender, 10-jointed, with small but stout unguiform apical claw. Legs slender, without auxiliary claws.

Rhopalorhynchus kröyeri Wood-Mason

Fig. 2

1873. Wood-Mason, loc. cit., p. 171, pl. 13.

1923. Calman, *Rec. Ind. Mus.*, xxv, p. 268, fig. 1 (references and synonymy; the date of publication of Haswell's *tenuissima* is 1885).

1953. Stock, *Temminckia*, ix, pp. 279, 280, fig. 1b (chart).

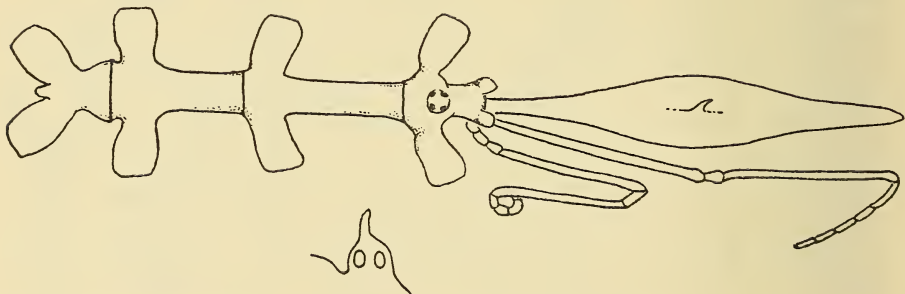


Fig. 2. *Rhopalorhynchus kröyeri* Wood-Mason. Dorsal view, with lateral view of ocular tubercle from right side.

Proboscis with a sharp denticle medio-dorsally at about the middle of its length. Ocular tubercle rather abruptly constricted above the eyes (cf. Carpenter, 1907, fig. 28). Oviger inner margins of 7th-10th joints with numerous feebly biserrate spines (in several rows), 10th joint in addition with a stout spine distally opposing the small unguiform claw (as in Calman's figure; apparently overlooked by Loman, 1908, pl. 15, fig. 216). Legs with coxal joints subequal, femur distally clavate in ♀, in ♂ more slender and less conspicuously clavate, 1st tibia slightly shorter than femur, 2nd tibia slightly shorter than 1st, tarsus about two-thirds propodus, claw strong, shorter than tarsus (cf. Loman, pl. 15, fig. 220).

Proboscis 7.5, femur 9, 1st tibia 8.5, 2nd tibia 7.5 mm.

Localities: off Hood Point, near East London, 42 fath.; off Port Shepstone, Natal, 24 fath.; and off Cape Natal (Durban), 85 fath. 3♀♀ (S. Afr. Mus.).

Distribution. Maldive Is., Ceylon, Indian Seas, Andaman Is., East Indies, Torres Straits, Queensland.

Remarks. The position of the denticle on the proboscis corresponds with Loman's fig. 215, not with Calman's fig. 1 *a, b*. Calman refers to the variation in the claw of the legs, but does not suggest that slender and strong claws are characteristic of the ♂ and ♀ respectively.

Fam. NYMPHONIDAE

1913. Schimkewitsch, *Zool. Anz.*, xli, p. 607.
 1913. Bouvier, *2me Exp. Antarct. Franc.*, p. 65.
 1932. Gordon, 'Discovery' *Rep.*, vi, p. 24.

Legs 8 or 10. Body segmented. Proboscis immovable. Chelifers well developed, usually conspicuously chelate. Palps 5-jointed (7-jointed in *Paranymphon* Caullery). Ovigera in both sexes, 10-jointed, with apical claw, last 4 joints usually with denticulate spines (8-jointed, without denticulate spines in *Paranymphon*). Legs with or without auxiliary claws. Genital apertures on all legs in ♀, on last 3 in ♂.

Gen. *Nymphon* Fabr.

1794. Fabricius, *Ent. Syst.*, iv, p. 417.
 1888. Sars, *Arch. Naturv. Christ.*, xii, p. 352 (*Chaetonymphon*).
 1908. Loman, *Siboga Exp.*, monogr., xl, p. 37.
 1915. Calman, *Brit. Antarct. (Terra Nova) Exp.*, zool. III, p. 28.
 1923. Loman, *Swed. Antarct. Exp.*, I, 2, p. 10.
 1932. Gordon, loc. cit., p. 26 (revision of Antarctic species).
 1937. Giltay, *Mem. Mus. Roy. Hist. Nat. Belge.* (2) fasc. 9, p. 83 (key to 7 species on west coast of Africa, Morocco to Cape of Good Hope).
 1944. Gordon, *B.A.N.Z. Antarct. Res. Exp.*, B, v, pt. 1, p. 17 (key to Antarctic and Subantarctic species).
 1951. Stock, *Mem. Inst. Roy. Sci. Nat. Belge.* (2) fasc. 43, p. 5.
 1953. id., *Temminckia*, ix, p. 282.

Octopodous. Proboscis subcylindrical. Ocular tubercle at base of neck, never in front of bases of ovigera, eyes usually present. Finger and thumb of chelifer with more or less slender spiniform denticles. Oviger with apical claw, last 4 joints with denticulate spines. Legs with or without auxiliary claws.

Remarks. A large genus, the Antarctic and Subantarctic species of which have been usefully analysed by Gordon.

Key to the South African Species

- I. Auxiliary claws vestigial or absent.
- A. Auxiliary claws vestigial. Main claw slender. Oviger modified; denticulate spines on last 4 joints 23-37. *australe*
- B. Auxiliary claws absent.
1. Finger and thumb of chelifer apically crossing, each with 50-65 spines. Palp 2nd joint longest.
- a. Neck short, crurigers narrowly separated.
- i. Crurigers less than half their own width apart. ♂ oviger modified, spines 48-50. *capense*
- ii. Crurigers about their own width apart. ♂ oviger not modified.
- a. Spines on oviger 54-63(66). *comes*
- β. Spines on oviger 44. *affinis*
- b. Neck long, crurigers widely separated. Spines on oviger 25. *natalense*
2. Finger and thumb of chelifer not crossing, with very numerous and fine spines (300 +). 2nd, 3rd and 4th joints of palp subequal. Spines on oviger 46. *microctenatus*
- II. Auxiliary claws well developed.
- A. Tarsus at least half length of propodus, sometimes a little longer than propodus.
1. Finger and thumb of chelifer apically crossing; former with many more (twice as many) spines than latter.
- a. Legs feebly setose.
- i. Neck short. Tarsus shorter than propodus. Oviger with 36-38 denticulate spines. *signatum*
- ii. Neck long. Tarsus longer than propodus. Oviger with 40-42 denticulate spines. *distensum*
- b. Legs strongly setose. Neck short. Tarsus shorter than propodus. Oviger with 23-26 spines. *pilosum*
2. Finger and thumb not crossing, an approximately equal number of spines on both.
- a. Finger and thumb each with less than 25 spines. Oviger with 34-36 spines. *crenatiunguis*
- b. Finger and thumb each with 45 or more spines. Oviger with 39 spines. *angolense*
- B. Tarsus only one-third length of propodus. Finger and thumb of chelifer with an equal and moderate number of long spines, and long curved setae on the setose pad. Oviger with 51-55 spines. *setimanus*

Nymphon australe Hodgson

1902. Hodgson, *Br. Mus. Rep. 'Southern Cross' Crust.*, p. 257, pl. 40.
1902. Möbius, *D. Tiefsee Exp.* iii, p. 181, pl. 26, figs. 1-6. (*Chaetonymphon altiocolum*.)
1913. Bouvier, loc. cit., p. 73, figs. 25-31 (*stylops*).
1915. Calman, loc. cit., p. 36 (synonymy).
1928. Flynn, loc. cit., p. 16.
1932. Gordon, loc. cit., p. 59, figs. 25 d, 26 b.
1938. id., *Austral. Antarct. Exp.*, C, II, 8, p. 13.
1944. id., loc. cit., p. 24 and var. *caecum*, p. 25, fig. 5 a-d.

Body compact, neck short, crurigers separated by a distance varying from a quarter to equality with their own width. Proboscis subcylindrical. Ocular

tubercle high, conical, eyes subterminal. Abdomen reaching to end of 1st coxa of last leg, clavate or pyriform. Sparsely setose on cephalic lobe and crurigers.

Chelifer scape longer than proboscis, hand subequal to scape, finger and thumb longer than palm, nearly straight, apically curved and crossing, each with 38-46 closely set spines. Palp with 2nd joint longest, 4th and 5th joints subequal. Oviger in ♂ modified, 5th joint longest, distal half strongly expanded, 6th joint also swollen, last 4 joints with 23-37 denticulate spines. Legs rather short, setose, 2nd coxa slightly longer than 1st + 3rd, femur shorter than either tibia, 1st tibia longer than 2nd, tarsus longer than propodus, claw slender, half length of propodus, auxiliary claws vestigial.

Body including abdomen 7-8 mm.

Locality: off Cape Point, 1,190 fath. (Flynn). The locality of another specimen, from a depth of only 46 fathoms, is regarded by Flynn as doubtful.

Distribution. Circumpolar (antarctic), nearest locality to South Africa: Bouvet Island.

Remarks. The s.s. *Pieter Faure* obtained no specimens referable to this species.

Nymphon capense Hodgson

? 1879. Böhm, *MB. Ak. Wiss. Berlin*, p. 173 (*phsmatodes*).

1908. Hodgson, *Tr. Roy. Soc. Edinb.*, xlvii, p. 169, pl. 1, figs. 2, 2a.

1928. Flynn, loc. cit., p. 4 (remarks on synonymy).

1932. Gordon, *Ann. Mag. Nat. Hist.* (10), ix, p. 117, figs. 11, 12 (redescription).

1932. id., loc. cit., pp. 27-32, 34 (in key), 62.

Body stout, neck short, base of oviger large, occupying most of the space between 1st cruriger and anterior cephalic expansion. Crurigers distinctly but narrowly separated. Ocular tubercle stout, low, rounded, eyes distinct. Proboscis bottle-shaped, apically rounded. Abdomen slightly longer than last crurigers, oblique (at about 45°).

Chelifer scape a little longer than proboscis, hand longer than scape, finger and thumb apically curved and crossing, with 60-65 closely set spines, in 2 or 3 alternating sizes. Palp with 2nd joint longest, 3rd, 4th and 5th progressively shorter. Oviger ♂ with 3rd joint inflated, 4th and 5th subequal, rather short and stout, 5th apically dilated, 6th deeply excavate on one side with long setae protruding from the cavity, last 4 joints with 48-50 denticulate spines (Hodgson: 15, 12, 11, 12; Gordon: 12, 12, 11, 13), claw with 13-15 spinules. In ♀ normal (see: *comes*). Legs slender, feebly setose, 2nd coxa equal to 1st + 3rd, femur shorter than 1st tibia, 2nd tibia longer than 1st (7, 8 and 10.7), tarsus and propodus equal or latter a little longer, claw two-thirds to three-quarters the length of propodus, no auxiliary claws.

Body (♂ ♀) 2.7-2.8, proboscis 1.3-1.6, 3rd leg femur 2.6-3, 1st tibia 3.4-4, 2nd tibia 4.4-6 mm. (Gordon).

Locality: off Dassen Island, 35 fath. ♀♀ and ovig. ♂♂ (Hodgson). South-west of Cape of Good Hope, 50 fath. (Böhm).

Remarks. Flynn thought that Hodgson's species was synonymous with Böhm's. Böhm's specimen was a ♀ with possibly abnormal ovigers. Hodgson's description was based on ovigerous ♂♂ as well as ♀♀, and the type material has been re-examined and figured by Gordon, who does not, however, discuss the possible synonymy. Giltay (1937) and Stock (1951) both accept the synonymy.

The species is a small one.

Nymphon comes Flynn

Figs. 3, 5c

1929. Flynn, loc. cit., p. 14, figs. 4-6.

Body stout, neck well marked, of medium length, cephalic segment subequal to rest of body (incl. abdomen). Crurigers separated by distances not quite equal to their own width, their length subequal to median width of segments. Ocular tubercle shortly conical, in juvenile (body 5 mm.) with 2 apical points (as seen from in front) which gradually disappear leaving a blunt point in adult, eyes distinct. Proboscis stout, expanded in middle, apically rounded. Abdomen about as long as last crurigers, slightly clavate, horizontal. A few minute setules on hind margins of segments, and on crurigers.

Chelifer scape slightly longer than proboscis, hand about equal to scape, finger and thumb longer than palm, apices curved and crossing, inner margins with more or less regularly alternating long and short spine-teeth, about 50 in number. Palp rather stout, 2nd joint longest, 3rd, 4th and 5th progressively shorter. Oviger in ♂ 4th joint slightly longer than 5th, slightly curved, 5th slightly curved at base, apically expanded on ventral surface with a semi-circle of strong spines, last 4 joints with 54-63 (66) denticulate spines resp. 17-21, 14-16, 11-12 (Flynn: 15), and 12-14. In ♀ 4th joint slightly longer than 5th, both nearly straight. Legs moderately slender, 1st tibia a little longer than femur, 2nd tibia one and a half to one and a third times as long as femur (Flynn says 2nd tibia is twice the femur and one and a half times 1st tibia, his measurements are nearly in agreement, but his figures are not), tarsus subequal to, or slightly shorter than propodus, claw half to two-thirds as long as propodus, no auxiliary claws. Femur and 1st tibia in ♂ not appreciably swollen distally. Femoral cement glands in ♂ (ventral) minute, very numerous, at least 70. Feebly setulose, more numerous setae on 1st and 2nd tibiae.

Body ♀ incl. abdomen 12, abdomen 1.5, proboscis 6, 2nd leg 67 mm. (femur 15, 1st tibia 17, 2nd tibia 20 mm.). Body ♂ incl. abdomen 10.5, abdomen 1.5, proboscis 5, 2nd leg 59 mm. (femur 12, 1st tibia 14.5, 2nd tibia 18 mm.).

Localities: False Bay, 22 fath. 1 ♂ (Flynn); off Cape Infanta, 46 fath. 4 ♀♀ 2 non-ovig ♂♂; off Cape Seal, 80 fath. 1 juv.; off Cove Rock (East London), 43 fath. 1 non-ovig ♂ (S. Afr. Mus.).

Remarks. In addition to the discrepancy in the leg shown in fig. 6, Flynn figures the oviger as 9-jointed (fig. 5).

Although reaching a larger size than Flynn's ♂ specimen (the East London ♂ is approximately the same size as the type), these specimens seem to belong to *comes*. There is one point of difference: the length of the claw of the legs.

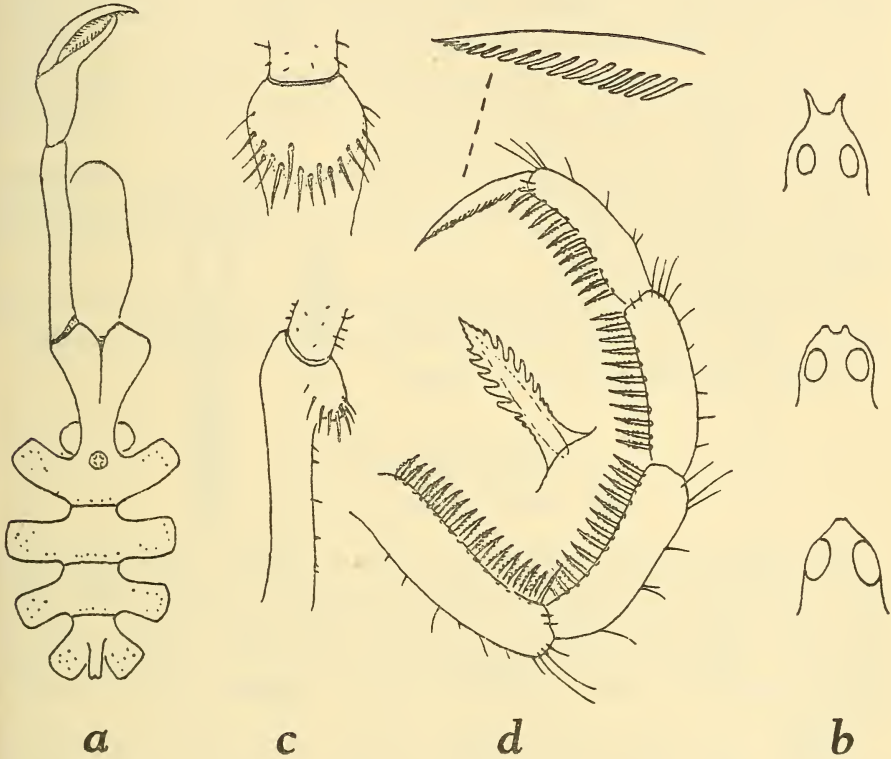


Fig. 3. *Nymphon comes* Flynn. *a.* dorsal view. *b.* front views of ocular tubercle of juvenile, 5 mm. in length (top), intermediate stage, and adult (bottom). *c.* oviger ♂ 5th joint, ventral view above, external view below. *d.* oviger ♂ distal joints with spine and claw further enlarged.

In the type it is about one-third the propodus, but in all the present specimens, including the juvenile, it is at least a half, usually two-thirds the propodus.

This is a much larger species than *capense* (*phasmatodes*), even the type being nearly three times as big; but it is difficult to find (from Hodgson's description) morphological differences. The denticulate spines on the last 4 joints of the oviger are given by Hodgson as resp. 15, 12, 11, 12 in number; and he describes the teeth on the finger and thumb of the chelifer as being of *three* sizes.

Nymphon affinis Stock

1951. Stock, loc. cit., p. 5, figs. 1-6.

This species, described from a single ♀ 5.8 mm. in length, is very close to *comes*, and Stock himself suggests that it may be the ♀ of the latter species of which only the ♂ has hitherto been known.

Stock relies on the following differences in establishing a separate species. Finger and thumb of chelifer with alternating larger and smaller spines; Stock considers that Flynn would certainly have mentioned this feature if it had been present in *comes*. The 5th joint of palp is relatively longer: five-sevenths the length of 4th, instead of half. The different number of spines on the oviger: 15, 11, 10, 8 = 44, as against 66.

Little reliance can be placed on the first difference, as Flynn's descriptions are not always very detailed. Variation would probably be found in the relative lengths of the joints of the palp and legs if a large number of specimens of different sizes were available.

For the present, *affinis* may stand, characterized by the 44 spines on the oviger. The 5 mm. juvenile specimen of *comes* has 54 spines on the oviger.

Locality: Lüderitzbucht, 8 fath. (Stock).

Nymphon natalense Flynn

1928 Flynn, loc. cit., p. 11, fig. 3.

Body slender, neck long and narrow, cephalic segment a little longer than rest of body (incl. abdomen). Crurigers separated by distances about twice their own width, their length considerably greater than median width of segments. Ocular tubercle shortly conical, eyes distinct. Proboscis rather stout, expanded in middle, apically rounded. Abdomen shorter than last crurigers.

Chelifer scape slightly shorter than proboscis, hand longer than scape by nearly one-third (details of finger and thumb not given). Palp 2nd joint longest, 3rd, 4th and 5th progressively decreasing. Oviger 5th joint longest, apically expanded in ♂, denticulate spines on last 4 joints resp. 9, 6, 5, 5. Legs long and slender, 2nd coxa very long, a little more than twice as long as 1st and about half the length of 1st tibia, 1st and 2nd tibiae subequal, tarsus shorter than propodus, claw about three-quarters the length of propodus, no auxiliary claws. Feebly setose.

Body 3.6, proboscis 1.2, leg 18.7 mm. (femur 3.2, 1st and 2nd tibiae 4 mm.).

Locality: off Port Natal (Durban), pelagic, 1 damaged ♂ (Flynn).

Remarks. There are several discrepancies between the description of the legs, the measurements, and the figure.

I have seen no specimens.

Nymphon microctenatus Brnrd.

Fig. 4

1946. Barnard, *Ann. Mag. Nat. Hist.*, (xi), 13, p. 60.

♀—Body moderately stout, neck moderate, base of oviger separated from 1st cruriger and occupying the whole of the rest of the neck behind the anterior cephalic expansion. Crurigers separated by about their own width, or rather less, their length subequal to median width of segments. Proboscis very stout,

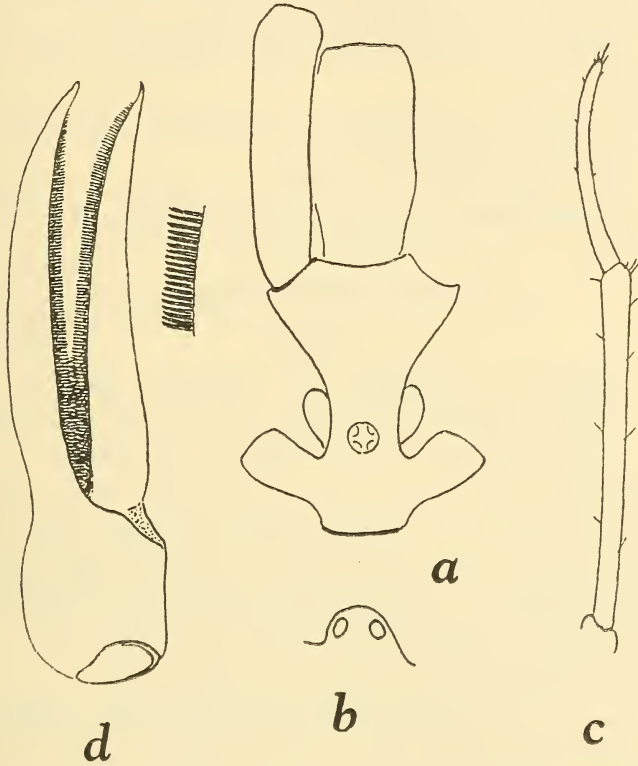


Fig. 4. *Nymphon microctenatus* Brnrd. a. dorsal view of cephalic segment with proboscis and basal joint of chelifer. b. lateral view of ocular tubercle. c. 4th and 5th joints of palp. d. inner view of chela (spines much more numerous than shown).

nearly evenly cylindrical, apex truncate. Ocular tubercle low and rounded, eyes distinct. Abdomen not extending beyond last crurigers, clavate, horizontal. Glabrous.

Chelifers widely separated at base, scape slightly longer than proboscis, hand about as long as scape, palm short, finger and thumb both slightly curved downwards, their apices following the same curve, i.e. not crossing, margins with an enormous number (estimated at 300-400) of slender closely set spinules

like a very fine comb. Palp long and very slender, almost glabrous, 2nd, 3rd and 4th joints subequal, 5th a little more than half 4th joint, gently curved. Oviger 5th joint longer than 4th (subequal to 3rd + 4th), 4th with slight swelling proximally on inner side, 5th straight, 6th with a rather prominent spine on inner apex, last 4 joints with 46 denticulate spines (14, 11, 10, 11) on inner margin, spines with 6 (4 major) denticulations, claw with 18-19 spines. Legs, coxae and femur moderately stout, tibiae distinctly more slender, 2nd coxa a little longer than 1st + 3rd, femur a little shorter than 1st tibia, 2nd tibia considerably longer than 1st, tarsus distinctly but not much shorter than propodus, claw about half the length of propodus, no auxiliary claws. Coxae and femur glabrous, 1st tibia very sparsely setose, 2nd tibia sparsely and finely setulose.

Body incl. abdomen 7.5, abdomen 1, proboscis 3, 2nd leg coxa 3.5, femur 10, 1st tibia 11.5, 2nd tibia 20 mm.

Locality: off Buffalo River (East London), 195 fath. 1 ♀ (S. Afr. Mus.).

Remarks. The specimen is broken in pieces, but all essential parts are present.

Nymphon signatum Möbius

Fig. 5a

1902. Möbius, *D. Tiefsee Exp.*, iii, p. 178, pl. 24, figs. 1-7.

1932. Gordon, *Ann. Mag. Nat. Hist.* (10) ix, p. 104, fig. 5 (redescribed).

1932. id., loc. cit., pp. 28-9 (in Table iii), 35 (in key).

Body moderately stout, neck stout and moderately long, base of oviger occupying two-thirds of its length, cephalic segment widely expanded. Crurigers separated by about half their own width, their length less than median width of segments. Proboscis stout. Ocular tubercle higher than wide, apex bluntly pointed or feebly bifid. Abdomen extending slightly beyond last crurigers, horizontal or slightly oblique. Glabrous.

Chelifer with a few setae dorsally and apically, chela at least as long as scape, finger and thumb apically curved and crossing, former with 60-64 spines, latter with about 35 longer spines, the two series of spines approximately the same length. Palp 2nd joint longest, 3rd-5th progressively shorter, 4th + 5th subequal to 3rd. Oviger in ♂ 4th joint slightly shorter than 5th, both curved, 5th with apical lobe bearing a semicircler of spines (cf. *comes*); in ♀ 4th joint longest, 4th and 5th joints straight; last 4 joints with 36-38 (11-13, 9-11, 7-9 and 8-10) denticulate spines, each with 5 major denticulations, claw two-thirds 10th joint, with 10 spinules.

Legs moderately long and slender, femur and 1st tibia distally swollen in ♂, femur shorter than 1st tibia, 2nd tibia longer than 1st tibia, with spines on its apex, tarsus nearly as long as propodus, latter with numerous spines on lower margin, claw nearly half length of propodus, auxiliary claws well developed. Feebly setose, especially in ♀, scattered setae on femur, more numerous on 1st

and 2nd tibiae. Femoral cement glands in ♂ (ventral) 17-20, the distal ones much smaller than the proximal ones.

Body incl. abdomen 8.5, proboscis 4.5, abdomen 1.5, 2nd leg femur 9, 1st tibia 11, 2nd tibia 15 mm.

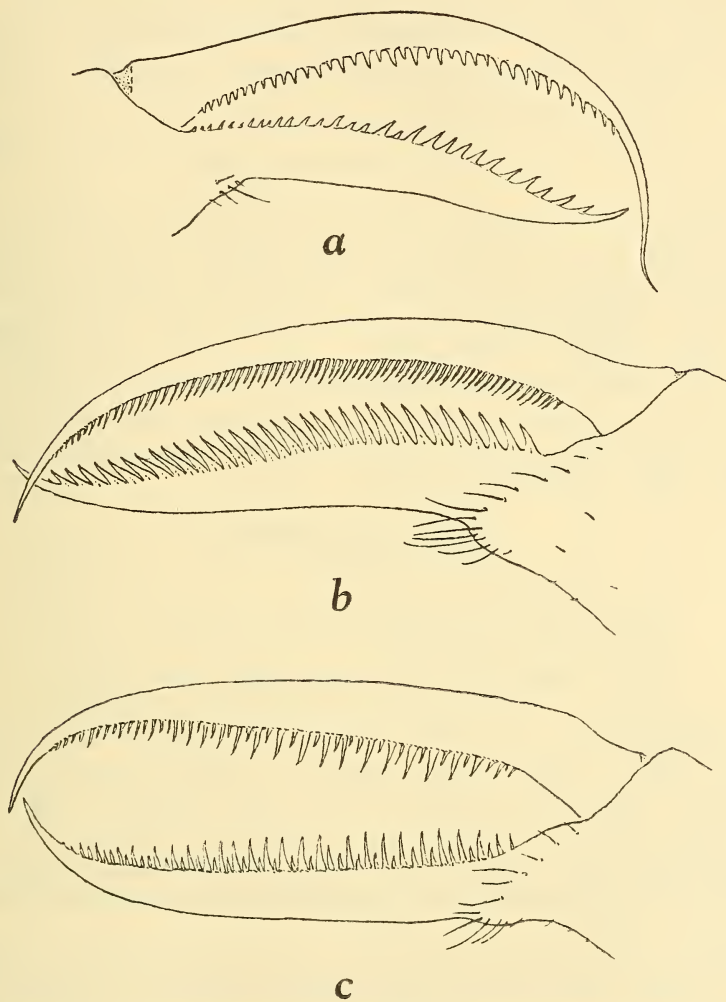


Fig. 5. Chela of: *a. Nymphon signatum* Möbius, juv. *b. Nymphon distensum* Möbius. *c. Nymphon comes* Flynn.

Localities: Agulhas Bank, 100 metres (Möbius); False Bay, 19-27 fath. 1 ovig. ♂; 10 miles off Cape St. Blaize, 1 ♀; off Gt. Fish Point, 49 fath. 3 ovig. ♂♂, 1 non-ovig ♂, 1 immature ♂; off Glendower Beacon (Port Alfred), 66 fath. 1 non-ovig. ♂ (S. Afr. Mus.).

Remarks. With the holotypes of this species and *distensum* before her, Gordon pointed out certain small differences, but remarked that intermediate forms

might be found to unite them. The small amount of material in my hands does not confirm this, although two of the differential characters mentioned by Gordon must be discarded. Spines are present in all cases on the apex of 2nd tibia; evidently in the holotype they had been rubbed off. Differences in the number of spines on ventral margin of propodus are not reliable.

The two species are distinguished by their build, length of neck, and relative lengths of tarsus and propodus (tarsus < propodus in *signatum*, tarsus > propodus in *distensum*).

The ♂ from False Bay is particularly heavily built, spines on finger and thumb of chelifer resp. 50 and 30, denticulate spines on oviger (only one is complete) 45.

A small specimen, body incl. abdomen 2.75 mm., from off Umhlangakulu River (Natal), 50 fath., may belong to this species. The neck and distance separating the crurigers as in *signatum*, but abdomen oblique, ocular tubercle rather high and distinctly bifid apically. Second coxa a little longer than 1st + 3rd, distinctly swollen apically. Oviger with 32 denticulate spines (10, 8, 6, 8). Chelifer hand with finger strongly curved, with fine apical point curving in the opposite direction, with 38 spines, thumb with 28 spines. Tarsus shorter than propodus, claw scarcely one-third length of propodus, auxiliary claws two-thirds main claw.

Nymphon distensum Möbius

Fig. 5b

- 1902. Möbius, loc. cit., p. 179, pl. 25, figs. 1-6.
- 1928. Flynn, loc. cit., p. 10.
- 1932. Gordon, loc. cit., p. 105, fig. 6 (redescribed).
- 1932. id., loc. cit., pp. 28-9 (in Table iii), 35 (in key).

Body rather slender, neck slender and rather long, base of oviger occupying less than half its length, cephalic segment not widely expanded. Crurigers separated by distances less than their own width (except the last 2 pairs), their length subequal to median width of segments. Proboscis stout. Ocular tubercle rather high, conical, more or less constricted above eyes, apex more or less distinctly bifid. Abdomen very slightly longer than last cruriger, clavate, horizontal. Glabrous.

Chelifer scape subequal to proboscis, hand as long as scape, finger and thumb apically curved and crossing, former with 60-70 (holotype ♀, *fide* Gordon: 60-64), latter with 30-33 longer spines, the two series of spines of approximately equal length. Palp 2nd joint longest, 3rd-5th progressively shorter, 4th + 5th subequal to 3rd. Oviger in ♂ 4th and 5th joints subequal, both curved, 5th with apical lobe bearing semicircllet of strong spines (*cf. comes*); in ♀ 4th and 5th joints subequal, both straight; last 4 joints with 40-42 (13-16, 9-11, 8-9 and 9-10) denticulate spines, each with 5 major denticulations, claw two-thirds to three-quarters length of 10th joint, with about 15 spines.

Legs long and slender, femur and 1st tibia distally swollen in ♂, 2nd coxa equal to or a little longer than 1st + 3rd, femur shorter than 1st tibia, 2nd tibia much longer than (one and one-third) 1st tibia, apex with spines, tarsus a little longer than propodus (Gordon: tarsus three-quarter length of propodus in 4th leg, but figure of 1st leg shows tarsus a trifle longer than propodus), claw about half length of propodus, auxiliary claws one-third, or a little more, main claw. Feebly setose, especially in ♀, a few scattered setae on 1st and 2nd tibiae. Femoral cement glands in ♂ (ventral) 12-15.

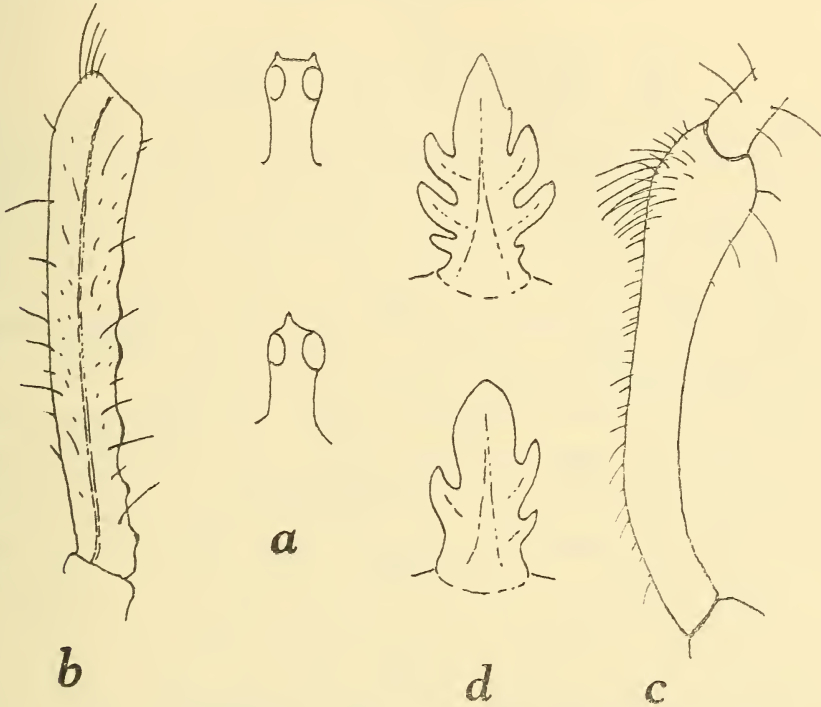


Fig. 6. *Nymphon pilosum* Möbius. a. ocular tubercle, front (above) and lateral (below) views. b. femur ♂. c. oviger ♂ 5th joint. d. spines from distal joints of oviger, normal and abnormal (or worn).

Body incl. abdomen ovig. ♂ 11, ♀ 13.5, abdomen ♂ 1.5, ♀ 2, proboscis ♂ 5, ♀ 6, 2nd leg ♂ 64, ♀ 92 mm. (femur ♂ 11.5, ♀ 20, 1st tibia ♂ 16, ♀ 23, 2nd tibia ♂ 25.5, ♀ 37.5 mm.).

Localities: Agulhas Bank, 154 metres, 1 ♀ (Möbius); off Gneka River, 43 fath. 1 ♀ (Flynn); off Buffalo River (East London), 195 fath. 3 ♂♂ (1 ovig.), 1 ♀; off Cape Morgan, 87 fath. 1 ♀; off Cape Seal, 37 miles, 80 fath. 1 juv.; Cape Point N. 71° E. 18 miles, 230 fath. 1 ♀ (S. Afr. Mus.).

Remarks. Holotype ♀ redescribed by Gordon. The few specimens I have examined all agree with *distensum* as described by Gordon, and for the present this species may be retained as distinct from *signatum*.

The largest ♀, whose measurements are given above, came from the Cape Point locality.

Flynn's specimen appears to be aberrant in having the tarsus shorter than propodus (cf. *signatum*) as in Möbius's figure, which, as Flynn says, cannot be relied upon for strict accuracy.

N. arabicum Calman 1938 seems to be very similar to *distensum*.

Nymphon pilosum Möbius

Fig. 6

1902. Möbius, loc. cit., p. 179, pl. 24, figs. 8-12.

1928. Flynn, loc. cit., p. 8, figs. 1, 2 (*bipunctatum*).

Body moderately stout, neck short and stout, base of oviger occupying whole space between 1st cruriger and cephalic expansion. Crurigers separated by about their own width or rather less, their length a little less than median width of segments. Proboscis moderately stout, usually widest in proximal half and slightly tapering to a rounded apex. Ocular tubercle rather high, columnar, slightly expanded above owing to the large eyes, surmounted by a transverse ridge which usually shows two little points. Abdomen distinctly longer than last crurigers, cylindrical or slightly clavate, horizontal. A few setae on hind margins of cephalic and following two segments.

Chelifer sparsely setose, subequal to or slightly longer than proboscis, hand subequal to scape, finger and thumb apically curved and crossing, former with about 40 spines, latter with about 26 larger spines, the two series of spines of approximately equal length. Palp 2nd joint longest, 4th and 5th subequal or the latter slightly the shorter, 4th + 5th subequal to 3rd. Oviger in ♂ 4th joint slightly curved, with slight swelling proximally on inner side, 5th slightly longer than 4th, curved, apically swollen, setose, especially on apex ventrally; in ♀ 4th and 5th joints subequal, straight; last 4 joints with 23-26 (9, 5-6, 4-5 and 5-6) (one specimen with 10, 6, 5, 6 = 27), stout and strongly denticulate spines, with 3 major denticulations, claw with 6-7 spines.

Legs moderately stout, femora and 1st tibiae not distally swollen in ♂, 2nd coxa subequal to, or in the juv., slightly longer than, 1st + 3rd coxae, femur shorter than 1st tibia, which is shorter than 2nd, tarsus distinctly though not much shorter than propodus, claw not quite half length of propodus, auxiliary claws about half length of main claw. A few setae on the coxae, femur with short and longer outstanding setae, tibiae with numerous long outstanding setae. Femoral cement glands in ♂ large, about 5 or 6 (4-7) on low knobs or ridges on ventral surface.

Body incl. abdomen 7, abdomen 1.75, proboscis 3, 2nd leg 38 mm. (femur 6, 1st tibia 7, 2nd tibia 9.5 mm.). The non-ovigerous ♂♂ are a little smaller than the largest ♀.

Localities: Agulhas Bank, 154 metres 1 ♀ (Möbius); off Port Natal (Durban), tow-net, 5 ♂♂, 4 ♀♀ (Flynn); off Cape St. Blaize, 85-90 fath., 4 non-ovig. ♂♂,

6 ♀♀; off Cape Seal, 80 fath. 1 ♀; off Cape St. Francis, 75 fath. 1 non-ovig. ♂; 36° 40' S. 21° 26' E., 200 fath. 1 ♀ (S. Afr. Mus.); 29° 56' S. 31° 11' E., 333 metres (Fisheries Survey, 1948).

Remarks. There would seem to be little doubt that *bipunctatum* is synonymous; at least it is strange that Flynn did not compare his specimens with *pilosum*; possibly being taken in a tow-net and therefore *presumed* to be pelagic unconsciously created an impression of specific distinctness.

The ocular tubercle is characteristic. The stout spines on the last joints of the oviger are also very striking.

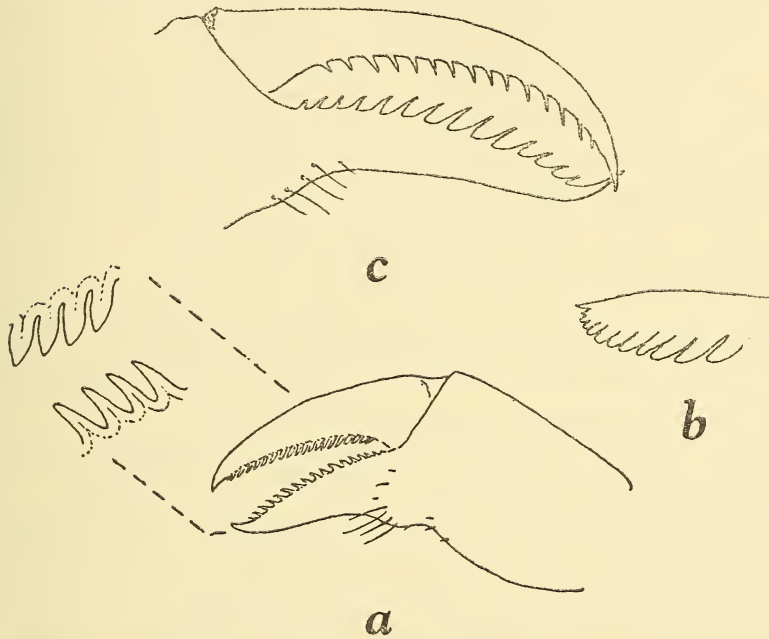


Fig. 7. *Nymphon crenatiunguis* Brnrd. a. chela with denticles further enlarged. b. apex of claw of oviger ♂♀. c. chela of a ♂ 2.25 mm. in length.

Owing to their pilosity the legs are often much obscured by foreign matter; some of the specimens have examples of the stalked barnacle *Scalpellum agulhense* Brnrd. attached to the legs; and one specimen has one of the barnacles standing upright immediately behind the ocular tubercle.

Nymphon crenatiunguis Brnrd.

Fig. 7

1946. Barnard, loc. cit., p. 60.

Body moderately stout, neck short, base of oviger contiguous with first cruriger and extending nearly to beginning of cephalic expansion. Crurigers separated by less than their own width, their length subequal to (a trifle

shorter than) median width of segments. Proboscis nearly cylindrical, apex rounded. Ocular tubercle rather low, conical, in front view with 2 little points surmounting the eyes. Abdomen slightly longer than last crurigers, clavate, oblique (at about 45°). Glabrous.

Chelifer scape subequal to proboscis, hand shorter than scape, palm oblong, widening slightly distally, finger and thumb relatively short and stout, former subequal to palm, apices not crossing, finger with 20(♀)-22(♂) closely set spiniform denticles, thumb with 18(♀)-17(♂) more slender and slightly more widely spaced denticles. Palp 2nd joint longest, 4th + 5th joints a little longer than 3rd, 5th longer than 4th. Oviger in ♂ 5th joint longer than 4th, gently curved, with apical lobe bearing strong recurved spines; in ♀ 4th and 5th subequal; last 4 joints with 34-36 denticulate spines (♂ 13, 7, 7, 7; ♀ 14, 9, 6, 6 and 13, 9, 7, 7), spines stout with 3 major denticulations. Claw with about 15 denticles, which distally become successively shorter and form a rounded and minutely crenulate (apparent) apex, the true apex being acute and minute. This form is found on both ovigers of the ♂ and of the ♀, though in one oviger of the latter the distal denticles are sharper and more prominent than in the figure (the apex thus appears more serrate than crenulate).

Legs moderately stout, 2nd coxa subequal to 1st + 3rd, femur shorter than 1st tibia, 2nd tibia longer than 1st, tarsus and propodus subequal, claws about one-third propodus, auxiliary claws strong, at least half main claw. Glabrous except the 2nd tibia which is sparsely and minutely setulose. Femoral cement glands in ♂ 4-5 low knobs or tubercles on ventral surface.

Body incl. abdomen ♂ 4, ♀ 3, abdomen ♂ .75, ♀ .5, proboscis ♂ 1.75, ♀ 1.5, leg femur ♂ 4.5, ♀ 4, 1st tibia ♂ 5, ♀ 5, 2nd tibia ♂ 7.5, ♀ 6.5 mm.

Locality: off East London, 85 fath. 1 non-ovig, ♂, 1 ♀ (S. Afr. Mus.).

Remarks. Distinguished by the hand of chelifer, which resembles in general that of *grossipes* Hoek 1881 and *multidens* Gordon 1932. As in these two species the 5th joint of the palp is longer than 4th; but the tarsus and propodus of the legs are subequal, and the spines on the last joints of oviger are different (in shape from those of *grossipes*, and in number from those of *multidens*). The apex of claw of oviger seems to be unusual if not peculiar.

One non-ovigerous ♂, body incl. abdomen 2.25 mm., from off Durnford Point, Zululand, 90 fath., agrees with the above described specimens in most characters, including the peculiar claw of the oviger, but has the hand of the chelifer slightly different. The finger is subequal to palm, but both it and the thumb are more slender, the former with 15, the latter with 14 denticles (fig. 7c). The femur has only 3, but very distinct, cement gland knobs. The 5th joint of oviger has the apical lobe with recurved spines, and the denticulate spines on last 4 joints number 12, 9, 7, 6.

Nymphon angolense Gordon

? 1923. Loman, *Goteb. K. Vet. Samh. Handl.*, xxvi 6 (Medd. Goteb. Mus. Zool. Avd. no. 22), p. 5. (*N. gracillimum*, non Calman.)

1932. Gordon, loc. cit., p. 77, figs. 36, 37.

1937. Giltay, loc. cit., p. 88.

1951. Stock, loc. cit., p. 7.

Neck long and slender, base of oviger contiguous with 1st cruriger. Crurigers separated by more than their own width, their length greater than median width of segments. Proboscis cylindrical, apex rounded. Ocular tubercle low, rounded. Abdomen slightly longer than last crurigers, elevated at about 45°.

Chelifer scape subequal to proboscis, hand slightly longer than scape, palm slender, finger and thumb slightly longer than palm, slender, apices crossed, about 55 spines on finger, 45 on thumb. Palp 2nd joint longest, 3rd three-fifths 2nd, 4th half 3rd and 5th slightly longer than 4th. Oviger in ♂ slender, 5th joint longer than 4th, straight, with a few hook-like spines on apex; in ♀ 4th and 5th joints relatively short; last 4 joints with 39 denticulate spines (13, 10, 8, 8) (Stock: ♂ 13, 9, 7, 7). Claw with 14 spinules.

Legs slender, 2nd coxa slightly longer than 1st + 3rd, femur shorter than 1st tibia, 2nd tibia longer than 1st, propodus slightly longer than tarsus, auxiliary claws at least two-thirds length of main claw.

Body incl. abdomen 7, proboscis 1.8-1.9, femur ♂ 6.8, ♀ 7, 1st tibia ♂ 9.2, ♀ 8.4, 2nd tibia 12 mm.

Localities: off Elephant Bay, Angola (approx. 13° 10' S. 12° 45' E.), 73-91 metres (Gordon); Tiger Bay, and Elephant Bay, 100-110 metres (Stock); off Port Alexander, 60 fath. (Loman).

Remarks. Gordon set out several differences between *angolense* and the holotype of *gracillimum*, but not the number of spines on the oviger. This is not included in Calman's original description but is given, on Calman's authority, by Loman (loc. cit., p. 5, footnote) as 33 (12, 8, 6, 7) and 30 (12, 7, 5, 6). Loman's specimens showed 31 (11, 6, 6, 8) and 28 (10, 7, 5, 6). All these numbers are less than those in *angolense*.

Gordon made no comment on Loman's record, but it seems more probable that the Port Alexander specimen ('verstümmelten', Loman) should be identified with *angolense* than with an Antarctic species, in spite of the difference in number of the spines on the oviger.

Port Alexander lies between the two localities recorded by Stock.

Nymphon setimanus Brnrd.

Fig. 8

1946. Barnard, loc. cit., p. 61.

Body moderately stout, neck long (cf. *distensum*), base of oviger contiguous with first cruriger and occupying one-third to nearly one-half of neck. Crurigers separated by rather less than their own width, their length subequal to median width of segments. Proboscis stout, nearly cylindrical, apex rounded-truncate. Ocular tubercle low, scarcely if at all higher than basal width, in lateral view

conical, in front view apically truncate, with two minute points above the eyes. Abdomen extending a little beyond last crurigers, somewhat elongate, oblique (at about 45°). Glabrous.

Chelifer scape a little shorter than (or scarcely as long as) proboscis, hand subequal to scape, finger and thumb much longer than palm, slender, curved, apically crossing, each with 13-15 equally long spines, setose pad well developed with numerous very long, almost spiniform setae on inner surface. Palp 2nd and 3rd joints subequal, or the latter a trifle the longer, 5th shorter than 4th, 4th + 5th longer than 3rd. Oviger 4th and 5th joints subequal, last 4 joints

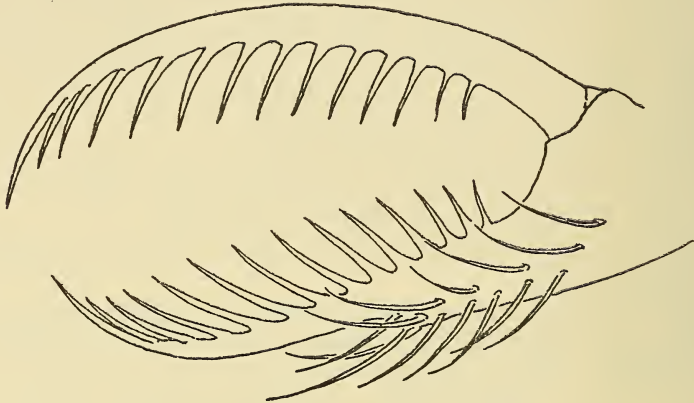


Fig. 8. *Nymphon setimanus* Brnrd. Inner view of chela ♀.

with 51-55 denticulate spines (15, 13, 12, 11 or 18, 12, 12, 11 or 19, 12, 11, 13), each with about 6 major denticulations, claw with about 13 denticles, the distal ones separated by crenulations, the apical point scarcely extending beyond last denticle (cf. *crenatiunguis*).

Legs moderately stout, 2nd coxa equal to or a trifle longer than 1st + 3rd coxae, femur only a little shorter than 1st tibia, 2nd tibia not much longer than 1st, tarsus short, about one-third propodus, claw short, subequal to tarsus, auxiliary claws two-thirds main claw. Almost glabrous, even on 2nd tibia only a few minute and scattered setules.

Body incl. abdomen 6, proboscis 2, abdomen 1.25, 2nd leg 2nd coxa 2.5, 1st + 3rd coxae together 5, femur 6, 1st tibia 6.5, 2nd tibia 7 mm. Pinkish, the palps and ovigers and a band around apex of femur pale whitish (Pt. Elizabeth Mus. and U.C.T. specimens).

Localities: Bird Island Passage (Algoa Bay), 10-16 fath. 1 ♀; off East London, 32 fath. 1 ♀; off Port Shepstone (Natal), 24 fath. 1 ♀ (S. Afr. Mus.); shelly beach, Cape Recife (Port Elizabeth Mus.); main channel, Knysna harbour; Bushmans River mouth (Algoa Bay) (Univ. Cape Town Ecol. Surv. 1947 and 1950).

Remarks. Distinguished from all the other South African species by the short tarsus.

Neck shorter than in *andamanense* Calman 1923. The hand of chelifer bears some resemblance to that of *maculatum* Carp. 1910.

Fam. PALLENIDAE

1908. Loman, *Siboga Exp. monogr.*, xl, p. 40, and conspectus facing p. 19 (subfam. *Palleninae*).
 1909. Schimkewitsch, *Zool. Anz.*, xxxiv, p. 6.
 1913. id., *ibid.*, xli, p. 610.
 1944. Gordon, *B.A.N.Z. Antarct. Res. Exp.*, B, v, pt. 1, p. 36.
 1947. Hedgpeth, *Smiths. Misc. Coll.*, cvi, p. 4.

Octopodous. Body segmented (or last two segments fused). Proboscis immovable. Chelifers present, chelate. Palps absent, or represented in ♂ by a 1-4-jointed rudiment. Ovigera in both sexes, 10-jointed, with or without apical claw, distal joints with a single row of serrate, acute, or oval spines. Legs with or without auxiliary claws. Genital pores on all legs in ♀, on last two legs in ♂. Eggs in several masses.

Key to the South African Genera

- I. Ocular tubercle at hinder end of cephalic segment.
- A. Legs with auxiliary claws. Palps absent.
1. Oviger without apical claw. Finger and thumb of chelifer serrate or spinose. *Callipallene*
2. Oviger with apical claw. Finger and thumb of chelifer smooth, with small dentiform lobe. *Pseudopallene**
- B. Legs without auxiliary claws.
1. Oviger with apical claw. Palps absent. *Parapallene*
2. Oviger without apical claw.
- a. Palps reduced to a single knob-like joint. *Metapallene*
- b. Palps absent. *Pallenoidea*
- II. Ocular tubercle at front end of cephalic segment. Palps absent or reduced to tubercles.
- A. Legs with auxiliary claws. Oviger without apical claw. *Pallenopsis*
- B. Legs without auxiliary claws. Oviger with apical claw. *Hannonia*

Gen. *Callipallene* Flynn

1836. Johnston, *Mag. Zool. Bot.*, i (4), p. 380. (*Pallene*; nom. preocc. Megerle, 1823.)
1908. Loman, loc. cit., p. 42. (*Pallene*.)
1929. Flynn, *Mem. Queensl. Mus.*, ix, p. 252, footnote.
1948. Correa, *Pap. Avulsos Dept. Zool. S. Paulo*, ix, 1, p. 1 (key to species).

*The presence or absence of auxiliary claws is not specifically mentioned in the single South African species referred to this genus. See p. 107.

1952. Stock, *Beaufortia*, no. 13, pp. 1-14, figs. 1-27. (European species.)

1953. id., *Boll. Mus. Civ. Venezia*, vi, 2, p. 179.

Cephalic segment with neck. Last 2 body segments often fused. Proboscis short, without setae around mouth. No trace of palps. Chelifer scape 1-jointed, finger and thumb finely denticulate. Oviger 10-jointed, without (usually) apical claw, spines on distal joints oval or round (not pointed), smooth or finely serrated, 5th joint in ♂ with apical process. Legs with auxiliary claws.

Callipallene sp.

Fig. 9

General appearance, length and shape of neck similar to fig. 7 of Stock 1952; all sutures between body segments distinct. Crurigers separated by

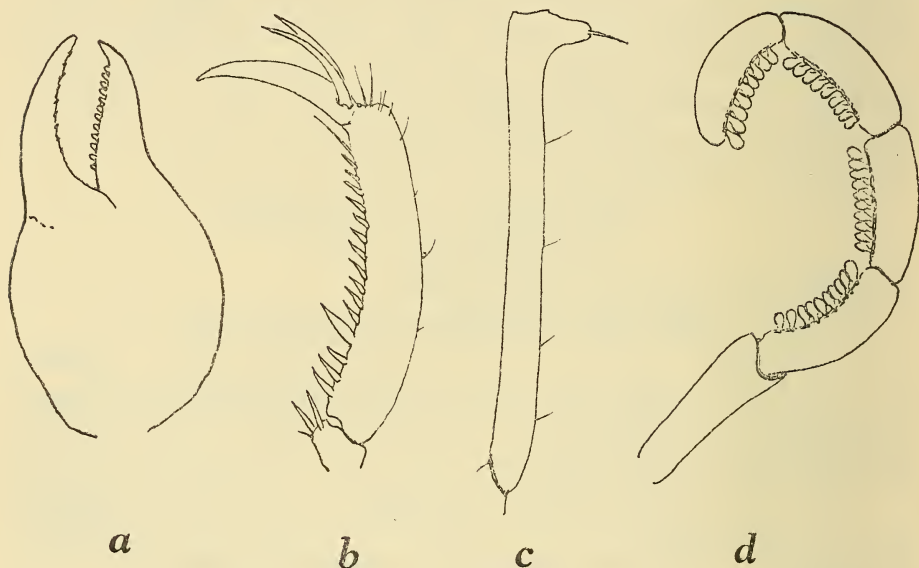


Fig. 9. *Callipallene* sp. a. hand of chelifer. b. propodus and claw of leg. c. 5th joint of oviger ♂. d. distal joints of oviger ♂.

intervals subequal to their own width; length slightly less than median width of segments. Ocular tubercle conical. Abdomen obliquely upturned at 45-60°. Body and crurigers glabrous.

Chelifer scape stout, hand turned downwards, inner margin of finger minutely and indistinctly serrulate, of thumb with about 10 conspicuous blunt spiniform teeth. Oviger 5th joint longest, in ♂ with outstanding apical process bearing a seta, the 4 distal joints with 38-46 (10, 10, 9, 9, 12, 12, 10, 12) bluntly rounded spines, the margins of which appear to be quite smooth, no apical claw.

Legs, femur in ♀ swollen, 1st tibia shorter than femur and shorter than 2nd tibia, which is slightly longer than femur, propodus gently curved, with 4 large spines proximally, auxiliary claws strong, two-thirds length of claw, simple (not pectinate at base); glabrous except for one or two fine setae on each joint.

Body incl. abdomen 1.5, 2nd leg 7.5 mm.

Localities: off Walker Point, 47 fath., and off Cape St. Blaize, 40 fath. (S. Afr. Mus.). Three specimens (2 ♂♂, 1 mutilated ♀ with developing ova).

Remarks. As these specimens show no outstanding features by which they can be separated from the other species of the genus, I think no specific name should be given to them until further material is available.

Gen. *Pseudopallene* Wilson

1804. Latreille, *Nouv. Dict. Hist. Nat.*, xxiv, p. 137. (*Phoxichilus*.)

1878. Wilson, *Trans. Connect. Ac.*, v.

1902. Stebbing, *Knowledge*, xxv, p. 187. (*Phoxichilus*, non. Latr.)

1909. Schinkewitsch, loc. cit., pp. 6, 7, 8.

1910. Hodgson, *Schultze Reise*, iv, p. 225 (in key).

1917. Bouvier, *Res. Sci. Camp. Monaco*, li, p. 28.

1928. Flynn, loc. cit., p. 23.

1951. Hedgpeth, *Smiths. Misc. Coll.*, cvi, p. 4.

1953. Stock, *Temminckia*, ix, p. 294.

[not *Pseudopallene* Bouvier 1913 = *Austropallene* Hodgson 1914]

Proboscis with setae around mouth. No trace of palps. Chelifer scape 1-jointed, hand short and swollen, finger and thumb not serrated or spinose, but with dentiform projections. Ovipiger 10-jointed, with serrated apical claw, 5th joint in ♂ with apical projection. Legs without auxiliary claws.

Remarks. After considerable argument as to the validity of Latreille's name, the name *Pseudopallene* seems to have been generally accepted.

Pseudopallene gilchristi Flynn

1928. Flynn, loc. cit., p. 23, fig. 13.

Body slender, segmented. Crurigers widely separated. Neck elongate. Ocular tubercle low, rounded. Abdomen shorter than last crurigers.

Chelifer scape shorter than proboscis, opposable margins of finger and thumb each with a small rounded lobe.

Legs slender, elongate, minute spines on 1st and 2nd tibiae, claw more than half length of propodus (no auxiliary claws?).

Body 3.6-3.9, femur 3.8-4.8, 1st tibia 4.5-5.6, 2nd tibia 6-6.8 mm.

Locality: off Port Natal (Durban), surface (tow-net) (Flynn).

Remarks. Flynn makes no mention of auxiliary claws; presumably they are absent, in conflict with the generic definition.

No examples of this species are in the South African Museum collection.

Gen. *Parapallene* Carp.

1892. Carpenter, *Sc. Proc. R. Dublin Soc.*, n.s., vii, p. 553.
 1908. Loman, loc. cit., pp. 40, 42.
 1909. Schimkewitsch, loc. cit., pp. 7, 9.
 1929. Flynn, *Mem. Queensl. Mus.*, ix, p. 258.
 1937. Calman, *Ann. Mag. Nat. His.* (10), xx, p. 530.
 1938. id., *John Murray Exp.*, v, p. 156.
 1953. Stock, *Temminckia*, ix, pp. 282, 297, fig. 2b (chart).

Body segmented. Proboscis constricted in middle. Chelifer scape 1-jointed, hand swollen, finger and thumb fitting closely together when closed, margins not denticulate. Palps completely absent. Oviger 10-jointed, in ♀ 4th joint longest and 5th without apical process, in ♂ 5th longest and with or without apical process, distal 3 or 4 joints with a row of biserrate (usually, sometimes obscurely serrate or simple) spines, with apical claw. Legs without auxiliary claws (except in *challengeri*). Genital pores on last 2 legs in ♂, on all legs in ♀.

Key to the South African Species

1. Each cruriger with conspicuous pointed process dorsally.
 - a. 3rd coxa with conical process of ventral apex. *spinosus*
 - b. 3rd coxa with semicircllet of strong spines on ventral apex. *calmani*
2. Crurigers without processes (or only a minute tubercle on each).
 - a. Neck long.
 - i. 3rd coxa with a single spine on ventral apex. Feebly serrate spines on 7th-10th joints of oviger 19, 16, 16, 16. *algoae*
 - ii. Strongly serrate spines on 7th-10th joints of oviger 10, 9, 7, 9. *nierstrazi*
 - b. Neck short. 3rd coxa with semicircllet of fine spinules on ventral apex. Feebly serrate spines on 7th-10th joints of oviger 8-9, 8-9, 7, 7-6. *hodgsoni*

Parapallene spinosus (Möbius)

Fig. 10

1902. Möbius, *D. Tiefsee Exp.*, iii, p. 188, pl. 28, figs. 8-12. (*Anoplodactylus s.*)

Crurigers well separated by about their own width, length subequal to or slightly longer than median width of segments; each with an upstanding conical process on dorsal apex. Neck moderately constricted, not defined by a collar at base. Proboscis cylindrical, apically truncate. Ocular tubercle high, conical, apex recurved and shortly bifid or narrowly truncate (acute in juv. with body length 7-8 mm.), eyes of uniform size. Abdomen in ♀ not longer than last crurigers, in ♂ slightly longer, rather stout, nearly erect. Glabrous.

Chelifer scape stout, with a spine on upper apex and a fringe of spine-setae on inner surface, hand curved downwards and inwards so that finger lies ventral to thumb, palm subglobular, setose on inner surface around base of finger and thumb, finger longer than thumb, inner margins of both entire. Oviger 4th joint longest, in ♀ 8th-10th joints with 7, 4-6, and 6 spines on inner margin, spines moderate, simple or sometimes obscurely notched, or apically somewhat hooked, claw with a few (8-9) spines on inner margin and 3 on both

inner and outer margins apically, the last pair adpressed to base of spiniform apex (but these somewhat variable); in ♂ 7th-10th joints with the spines slightly stronger than in ♀ but not stout (claw missing in the only adult ♂ specimen).

Legs rather stout, 3rd coxa with a conspicuous conical process on ventral apex, femur about one and a half times 1st tibia, with 3 conical tubercles on dorsal apex, the medio-dorsal one much larger than the dorso-lateral ones, 1st tibia with 4 conical tubercles on dorsal apex, the dorsal pair larger than the

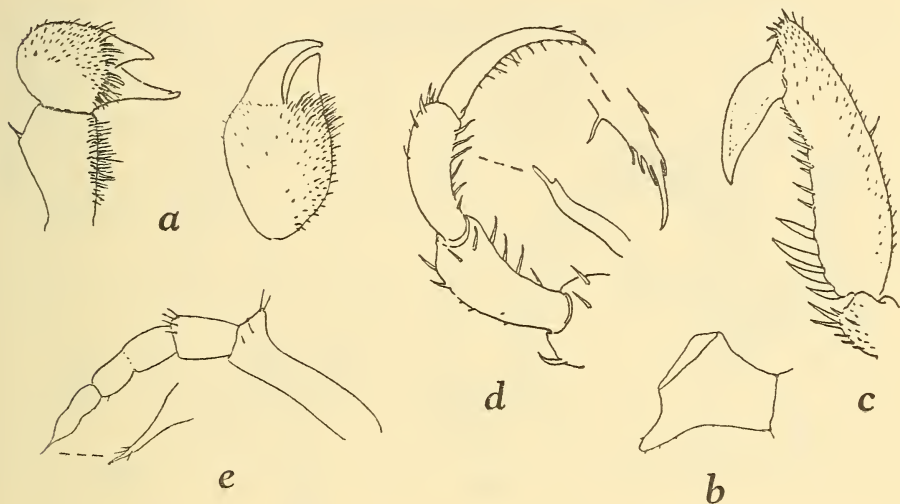


Fig. 10. *Parapallene spinosus* (Möbius). a. inner and front views of left chela. b. lateral view of 3rd coxa of leg. c. propodus and claw of leg. d. 9th and 10th joints with claw of oviger ♀. e. oviger of juvenile, body length 8 mm.

lateral ones (but not as large as the medio-dorsal one on femur), also a small medio-dorsal tubercle near base, and one near middle on each lateral surface; 2nd tibia a little longer than femur; propodus without heel, with 4 strong spines proximally on lower margin, followed by smaller ones, upper apex projecting over base of the stout claw. Very short and fine spinules ventrally on apices of 2nd and 3rd coxae; on the other joints in these spinules become more numerous distally, especially on 2nd tibia, but to the naked eye the legs appear glabrous or the tibiae very finely hispid; in ♂ however there are a few distinct but slender spines on femur, several on 1st tibia, and more on 2nd tibia.

Base of chelifers to base of abdomen ♀ 10, abdomen 2.2-2.5, proboscis 3, 2nd leg 38 mm. (femur 10.5, 1st tibia 6.5, 2nd tibia 12).

Localities: St. Francis Bay, Agulhas Bank, 10 metres (Möbius); off East London, 52 fath. 1 ♀, 1 juv.; off Glendower Beacon (Port Alfred), 66 fath. 1 not quite adult ♂; False Bay, 17-33 fath. 2 ♀♀, 2 juv.; Table Bay, 22 fath. 1 ♂ (S. Afr. Mus.).

Remarks. The conical process of the 3rd coxa is very conspicuous and forms an easy mark of identification. See further under *calmani*.

Loman (1908, loc. cit., p. 64) suspected that this species should not be included in *Anoplodactylus* on account of the number (9) of joints in the oviger. The South African Museum specimens confirm this. They are obviously examples of *spinusus*, although Möbius seems to have ignored the position of

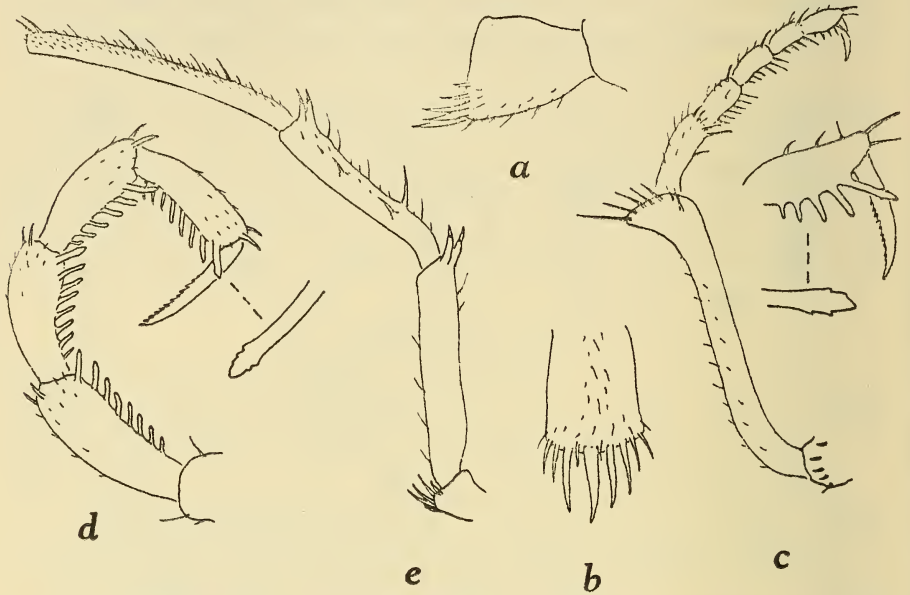


Fig. 11. *Parapallene calmani* Flynn. *a, b.* lateral and ventral views of 3rd coxa of leg. *c.* distal joints of oviger ♂ with 10th joint and claw further enlarged. *d.* distal joints of oviger ♀. *e.* femur and 1st and 2nd tibiae of leg ♂.

the ocular tubercle and makes no mention of it as he does in the case of *Anoplodactylus aculeatus*. He had only one specimen and rashly assumed that the ♀ would be without ovigers.

One of the South African Museum specimens (body length 8 mm.) is particularly interesting because it has an oviger closely resembling Möbius's figure 12; a figure is given here showing that it is not quite fully developed, with the distal joints not completely demarcated and without spines on inner margins.

P. spinusus is a larger species than *calmani*.

Parapallene calmani Flynn

Fig. 11

1928. Flynn, loc. cit., p. 16, figs. 7, 8.

In general the description given for *spinusus* will apply to *calmani*. Chelifer with spine on upper apex. The 3rd coxa is not conically produced, but has a

semicircler of about 8-9 strong spines on ventral distal margin. The oviger, both in ♂ and ♀, has stronger spines on the inner margins of 7th-10th joints.

Localities: off East London, 47 fath. (Flynn); Algoa Bay, 10-17 fath. 3 non-ovig. ♂♂, 1 ♀; off Glendower Beacon (Port Alfred), 66 fath., 1 non-ovig. ♂ (S. Afr. Mus.).

Remarks. The presence in South African waters of two species both with conical projections on the crurigers makes the identification of Flynn's species a little doubtful. Flynn might have overlooked the apical spines on the 3rd coxa, and his fig. 8 gives no indication of them; on the other hand he could scarcely have overlooked conspicuous conical processes and his figure, from the viewpoint from which it is drawn, would surely have given *some* indication

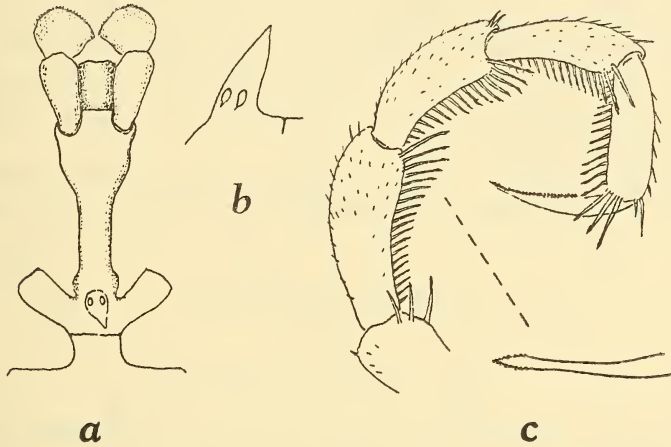


Fig. 12. *Parapallene algoae* Brnr. a. cephalic segment with chelifers. b. lateral view of ocular tubercle. c. distal joints of oviger ♀.

of projections if they had been present. I therefore assign the specimens with a semicircler of spines on 3rd coxa to *calmani*; and the species with conical processes on 3rd coxa is obviously *spinosus* (Möbius).

Flynn says the 4th joint of the 10-jointed oviger is the longest; his fig. 7 shows *seven* joints beyond the longest joint, making an 11-jointed oviger. This is probably a draughtsman's error.

Parapallene algoae Brnr.

Fig. 12

1946. Barnard, loc. cit., p. 61.

Body rather slender. Crurigers without processes, well separated by at least their own width, length greater than median width of segments. Neck well marked, only half as wide as apical width of cephalon, not defined by a

collar. Proboscis cylindrical, apically truncate. Ocular tubercle high, conical, apex, acute, eyes of uniform size. Abdomen shorter than last crurigers, nearly vertical. Body and crurigers microscopically hispid.

Chelifer as in *calmani*, but without spine on upper apex of scape. Oviger (♀) 4th joint longest, 7th-10th joints with numerous spines: 19, 16, 16, 16, spines biserrate apically, claw finely serrate on inner margin except at base.

Legs (♀) 3rd coxa with a single short but prominent spine on ventral apex, dorsal apex of femur and 1st tibia each with a semicirclet of 4-6 spines, 1st tibia distinctly shorter than femur, 2nd tibia one and a half to one and three-quarter times as long as 1st tibia, propodus as in *calmani* but lower margin with 7-8 large spines, 3 or 4 of the proximal ones being the largest, claw relatively longer than in *calmani*. Femur minutely hispid, 1st tibia finely spinulose-setose, 2nd tibia more strongly so, the longest (but none as long as width of tibia) spine-setae forming a row or fringe along each side.

Base of chelifers to base of abdomen 15, abdomen 2, proboscis 4.5 mm.; in S. Afr. Mus. specimens all legs severed from bodies, longest 80 mm. (femur 19.5, 1st tibia 14, 2nd tibia 29).

Localities: Algoa Bay, off Gt. Fish Point, and off Cape Morgan, 32-87 fath. 4 ♀♀ (S. Afr. Mus.); Plettenberg Bay, 30 fath. (Port Elizabeth Mus.).

Parapallene hodgsoni Brnrd.

Fig. 13

1946. Barnard, loc. cit., p. 61.

Crurigers well separated by about their own width, length subequal to median width of segments, each with a very small tubercle on upper surface near apex. Neck constricted, but short, without collar at base. Proboscis cylindrical, apically truncate. Ocular tubercle high, conical apex acute or bifid, eyes of uniform size. Abdomen as long as last crurigers, oblique. Body and crurigers glabrous.

Chelifer as in *calmani* but without spine on apex of scape. Oviger (♀) 4th joint longest, 7th-10th joints with rather stout spines resp. 8-9, 8-9, 7, 7-6, spines simple or feebly serrate subapically, claw very feebly serrulate on inner margin.

Legs (♀) 3rd coxa with semicirclet of fine spinules on ventral apical margin, femur longer than 1st tibia, 2nd tibia longer (about one and one-third) than femur, propodus as in *calmani* but spines on distal part of lower margin stronger. Femur slightly hispid, 1st and 2nd tibiae more conspicuously so, 2 (or 3) small spiniform tubercles on upper apex of femur and 1st tibia.

Base of chelifers to base of abdomen 8.5, abdomen 1.5, proboscis 3 mm.; 2nd leg 48 mm. (femur 12, 1st tibia 10, 2nd tibia 16.5 mm.).

Localities: off East London and Hood Point, 47-52 fath. 3 ♀♀, 1 juv. (S. Afr. Mus.).

Remarks. The feebly serrate or simple spines on 7th-10th joints of oviger prevent these specimens from being identified with *nierstraszi*; also the neck is shorter.

Parapallene nierstraszi Loman

1908. Loman, loc. cit., p. 44, pl. 9, figs. 122-127.
 1928. Flynn, loc. cit., p. 18.
 1938. Calman, loc. cit., p. 158, fig. 7.
 1953. Stock, loc. cit., pp. 297, 299, fig. 3 a (chart).

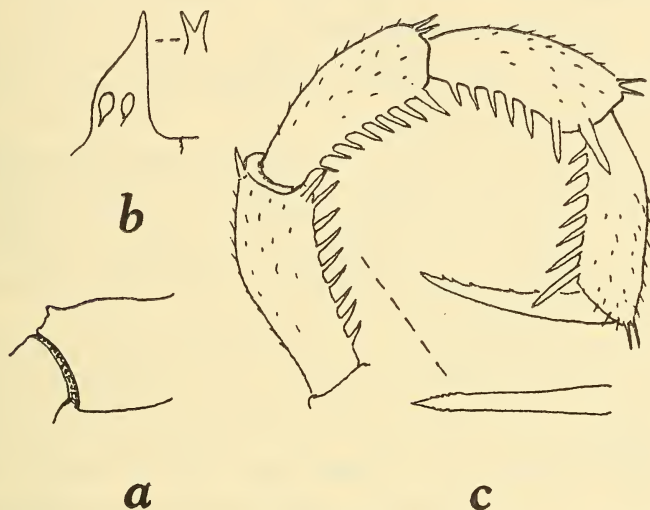


Fig. 13. *Parapallene hodgsoni* Brnrd. a. posterior view of cruriger. b. lateral view of ocular tubercle, with hind view of apex. c. distal joints of oviger ♀.

Locality: 29° 35' S., 31° 14' E. (Natal), 25 fath. (Flynn).

Distribution. East Indies.

Remarks. Calman examined a syntype which had the ocular tubercle truncate with 2 points (fig. 7 A); this might be regarded as a malformation. He also described the spines on the coxae and following joints but without stating whether they were dorsal or ventral; presumably they were dorsal.

The spines on 7th-10th joints of oviger are strongly serrate (Loman, fig. 124).

Gen. *Metapallene* Schimk.

1909. Schimkewitsch, loc. cit., pp. 7, 11, and table I.
 1910. Hodgson, loc. cit., p. 235 (*Heteropallene*).
 1938. Helfer, *SB. Ges. naturf. Fr. Berlin*, 1937, p. 172 (*Procidella*).
 1952. Stock, *Bull. Inst. Roy. Sci. Nat. Belge*, xxviii, 14, p. 4 (remarks on *Procidella*).
 1953. id., *Beaufortia*, IV, No. 35, p. 38 (remarks on *Procidella*).

Body robust, segmented, crurigers not widely separated. Cephalic segment broad, distally expanded, neck short. Proboscis short, without setae around mouth. Abdomen short. Ocular tubercle at base of neck. Chelifer scape 1-jointed. Palp reduced to a single joint. Oviger 10-jointed, 5th joint with or without apical process in ♂, distal joints with a single row of denticulate spines, no apical claw. Legs without auxiliary claws.

Remarks. At Lüderitzbucht, S.W.A., three specimens of a small Pycnogonid have been collected and each has been made the type of a new species by three separate authors. Although one suspects that these three specimens all belong to one and the same species, the question is into what genus this species should be put. Two new genera have been proposed.

Heteropallene Hodgson must fall into synonymy, because both Hodgson and, a year earlier, Schimkewitsch named *Pallene languida* Hoek (1881, p. 79, pl. 12, figs. 1-5) as the genotype of their genera.

M. languida is based on a ♂ with the palps reduced to mere knobs; Hodgson's specimen, sex not stated, had rudiments of palps 'each a slightly curved joint'; in *Procidella* based on a ♀ Helfer said each palp was reduced to a single conical joint, but this is really the undeveloped oviger (see his figure) which he stated was absent. In Hodgson's specimen the 5th joint of the oviger ♂ has no apical process, whereas in *M. languida* it has.

In view of these ambiguities, the two earlier Lüderitzbucht specimens can be only provisionally included in *Metapallene*, with *Procidella* as a synonym. The third specimen has recently been adequately described as *Pallenoides magnicollis* (see *infra*).

Stock (1953) considers that *Procidella gibber* may be identical with *M. dubitans*, but that as it was founded on a juvenile specimen it should be ignored.

Metapallene dubitans (Hodgson)

Fig. 14a

1910. Hodgson, loc. cit., p. 226, fig. 4 (distal joints of oviger) (*Heteropallene d.*).
 1938. Helfer, loc. cit., p. 172, fig. 5 (*Procidella gibber*).
 1953. Stock, loc. cit., p. 38, fig. 3 (*Procidella gibber*).

Body very robust, crurigers narrowly separated, with a few small setae distally, the posterior pair very short and almost completely fused, with the short abdomen embedded between them (Hodgson) or freely projecting (Helfer's figure). Ocular tubercle low, broad, near hind margin of cephalic segment (Helfer's figure); eyes small (Hodgson), without pigment (Helfer).

Chelifer stout, scape and hand setose, finger and thumb denticulate. Oviger 4th and 5th joints longest, 5th without apical process (Hodgson's figure), 7th-10th joints with 45 (12, 10, 11, 12 in Hodgson's figure) serrate spines; no apical claw.

Legs sparsely setose; propodus with 2 large spines proximally, claw very stout, no auxiliary claws.

Length 1.5 mm. (Hodgson), 4.4 mm. (Helfer).

Locality: Lüderitzbucht (Hodgson, Helfer). Hodgson's specimen was collected by Dr. L. Schultze; Helfer's specimen was collected 18 Dec. 1903, therefore presumably also by Dr. Schultze who was in Lüderitzbucht in December 1903 (1908. Schultze, *Reise*, i, Introduction, p. vi).

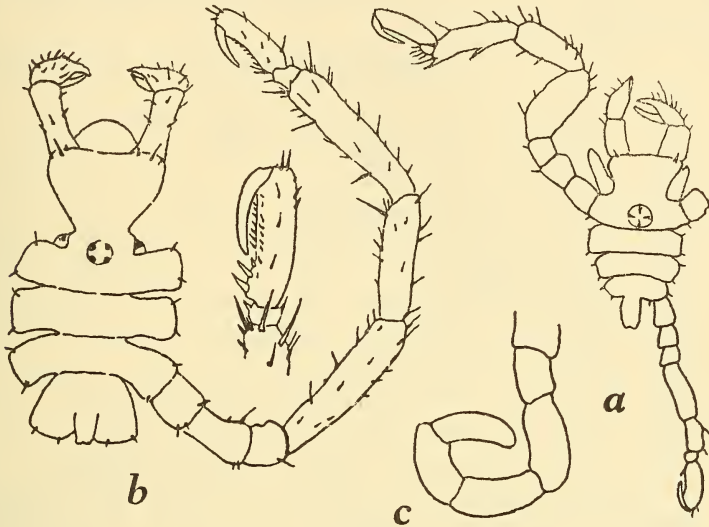


Fig. 14. a. *Procidella gibber* Helfer ♀ (after Helfer). b, c. *Pallenoides magnicollis* Stock, ♂ with propodus of leg and distal joints of oviger (spines omitted) further enlarged (after Stock).

Gen. *Pallenoides* Stock

1951. Stock, *Mem. Inst. Roy. Sci. Nat. Belge*, (2) fasc. 43, p. 8.

1952. id., *Bull. Inst. Roy. Sci. Nat. Belge*, xxviii, 14, p. 4.

Differs from *Metapallene* in having no trace of palps. Oviger without apical process on 5th joint ♂. Proboscis with a constriction near base, and setae around mouth.

Pallenoides magnicollis Stock

Fig. 14b, c

1951. Stock, loc. cit., p. 11, figs. 7-13.

Compared with *Metapallene dubitans* the following points may be noted.

Abdomen short, embedded between the last crurigers as in Hodgson's description (thus differing from Helfer's *Procidella*). Ocular tubercle farther forward than in Helfer's figure; eyes distinct. Oviger with 48 (14, 11, 10, 13) serrate spines on 7th-10th joints.

Length 1.75 mm. (♂).

Locality: Lüderitzbucht, 8 fathoms. 'Mercator' (Stock).

Remarks. The locality and the close resemblance of this specimen to the specimens described by Hodgson and Helfer, lead one to suspect that all three specimens belong to one species. However, Stock has given a good recognizable description of a species, whereas it must be admitted that *dubitans* is a *species inquirenda*. Provisionally therefore I follow Stock. Re-examination of Hodgson's and Helfer's specimens may help, but abundant fresh material is really required to solve the problem satisfactorily.

Gen. *Pallenopsis* Wilson

1881. Wilson, *Bull. Mus. Comp. Zool. Harv.*, viii, p. 250.
 1902. Möbius, *D. Tiefsee Exp.*, iii, p. 184.
 1908. Loman, loc. cit, p. 65.
 1913. Bouvier, *2me Exp. Antarct. Fr.*, p. 107.
 1915. Calman, *Terra Nova Exp.*, iii, p. 41.
 1916. Loman, *Zool. Med.*, ii, p. 15.
 1923. Calman, *Rec. Ind. Mus.*, xxv, p. 279.
 1927. Hodgson, *D. Südpol Exp.*, xix, p. 334.
 1932. Gordon, '*Discovery*' *Rep.*, vi, p. 87.
 1933. Stephensen, *Medd. om Gronland*, lxxix, 6, p. 21.
 1947. Hedgpeth, *Smiths. Misc. Coll.*, cvi, pp. 3, 4, 6.
 1953. Stock, *Temminckia*, ix, pp. 281, 288, fig. 4 (chart).

Body segmented, or segments fused. Ocular tubercle on front margin of cephalic segment overhanging base of proboscis. Chelifer with scape 2-jointed, or undivided, finger and thumb moderate, when closed meeting or gaping. Palps reduced to tubercles. Oviger 10-jointed in ♂, in ♀ rudimentary, some of the joints sometimes fused; apical joint with numerous spine-setae, or a single row of non-serrate spines, no apical claw. Legs with auxiliary claws large or small, occasionally absent. Genital pores on last two legs in ♂, on all legs in ♀.

Key to the South African Species

- A. Finger and thumb of chelifer meeting when closed.
1. Body segmented.
 - a. Auxiliary claws strong.
 - i. 2nd tibia one and one-sixth to one and a quarter as long as 1st tibia. Legs (at least in ♂) conspicuously setose. *intermedia*
 - ii. 2nd tibia one and one-third to one and a half as long as 1st tibia. Legs not conspicuously setose. *capensis*
 - b. Auxiliary claws weak. *brevidigitata*
 2. Body unsegmented or partly segmented (*Rigona*).
 - a. All segments fused. 1st tibia with a few spine-setae, some arising from small tubercles. *ovalis*
 - b. 3rd and 4th segments fused. 1st tibia with numerous digitiform processes bearing spine-setae. [*crosslandi*]*
- B. Finger and thumb of chelifer slender, curved, gaping when closed. *oscitans*

* *P. crosslandi* Carpenter (1910. *J. Linn. Soc. Lond.*, xxi, p. 257, pl. 27, figs. 10-20. Sudanese Red Sea) is included because it was listed by Flynn (1928, p. 6), although neither Flynn nor, so far as I can discover, any other author has recorded it from South African waters.

Pallenopsis intermedia Flynn

Figs. 15a, 16

? 1923. Loman, *Ark. Zool.*, xv, 9, p. 10. (*Pallenopsis* sp.)1923. id., *Medd. Goteb. Mus.*, no. 22 (Goteb. K. Vet. Handl., xxvi), p. 3
(*fluminensis*, non Kröyer).

1928. Flynn, loc. cit., p. 20, figs. 10-12.

Body segmented. Crurigers well separated, but by spaces less than their own width. Ocular tubercle conical, ending in a sharp point, anterior eyes

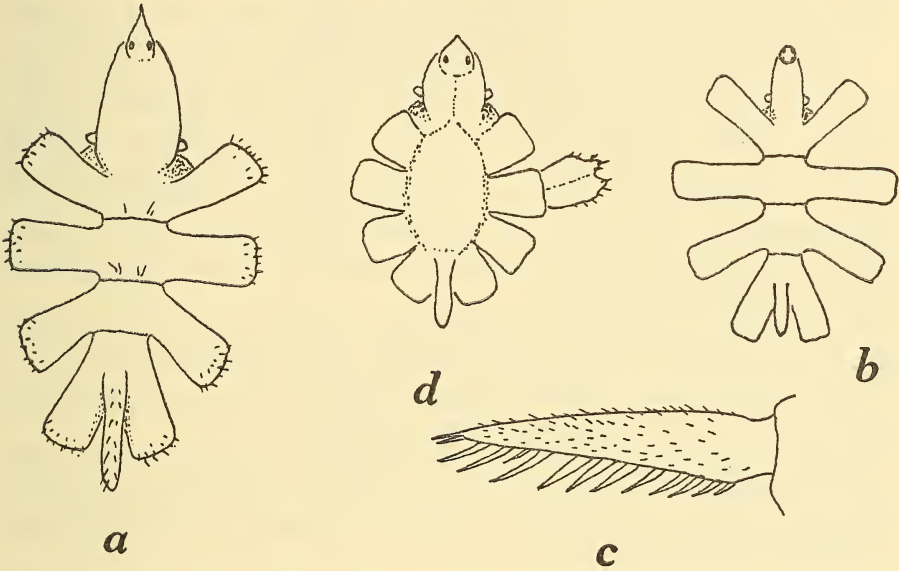


Fig. 15. a. *Pallenopsis intermedia* Flynn. b, c. *Pallenopsis brevidigitata* Möbius, with 10th joint of oviger. d. *Pallenopsis ovalis* Loman.

larger than posterior pair. Proboscis cylindrical, apically rounded. Abdomen directed more or less obliquely upwards. Spiniform setae on dorsal surface of body, scattered or more or less in paired groups of 1 or 2 on each segment, shorter and more numerous along ends of crurigers, ♀ usually less setose than ♂; abdomen with 2 rows of spines (often rubbed off).

Chelifer scape divided into 2 subequal portions, with spiniform setae on distal margin of each; finger and thumb simple, closely fitting, finger longer than thumb, glabrous (without spinose pad). Palpal tubercles distinct. Oviger 10th joint as long as 9th, oval, apically blunt, with numerous spine-setae; in ♂ 5th joint distinctly longer than 4th, and 6th conspicuously swollen.

Legs 2nd coxa subequal to 1st + 3rd, femur and 1st tibia subequal or the latter slightly the shorter, 2nd tibia slightly longer than femur; propodus cylindrical, without heel and not projecting over base of claw; auxiliary claws large, at least half length of main claw; short spiniform setae on all

joints, longer setae on 1st and 2nd tibiae arranged chiefly in 3 fringes (one mid-dorsal and one along each side), some of the longest setae slightly pinnate, ♂ more conspicuously setose than ♀. Cement duct on ventral surface of femur short but distinct in ovig. ♂.

Body incl. abdomen ♂ 13, ♀ 15, proboscis ♂ 5, ♀ 6, 2nd leg ♂ 56 (femur 13, 1st tibia 12, 2nd tibia 14), ♀ 67 mm. (resp. 17, 15, 18). Amber-coloured, darker lines on sides of legs.

Localities: Sebastian Bay, Walker Bay, Cape Barracouta and Cape Infanta, 24-40 fath. (Loman); False Bay, off Cape Infanta, and off Gneka River (see footnote, p. 85), 23-43 fath. (Flynn); False Bay and Agulhas Bank as far east as Cape St. Francis, and in the East London area, 20-90 fath. (S. Afr. Mus.).

Remarks. In the s.s. *Pieter Faure* collection there are no specimens from the area between Cape St. Francis and the East London area (of which the most westerly locality is Gneka River mouth) in spite of the very considerable amount of trawling done in and around Algoa Bay. On the trawling grounds on the Agulhas Bank between Cape Infanta and Cape St. Francis this is the commonest Pycnogonid. For this reason it seems certain that the specimens identified as *fluminensis* Kröyer (a Brazilian species) by Loman (1923) should really be assigned to *intermedia*.

Ovigerous ♂♂ were found in September, October, December, February, April, May and July; thus breeding probably occurs throughout the year.

Apparently very like *vanhöffeni* Hodgson (1927. loc. cit., p. 336, fig. 9) from the Antarctic, but the latter has a slender proboscis.

Loman (1923. *Ark. Zool.*) did not give the size of his specimen from Cape Point Lighthouse; presumably it was collected in the littoral zone like *Discoarachne brevipes* and *Nymphopsis abstrusus* (= *cuspidata*). It may perhaps be a specimen of this species.

Pallenopsis capensis Brnrd.

1946. Barnard, loc. cit., p. 62.

Body segmented. Crurigers widely separated (cf. *brevidigitata*, fig. 15b), each longer than median width of segment and about one and a half times as long as their own width. Ocular tubercle high, bluntly conical, anterior eyes slightly larger than posterior pair. Proboscis cylindrical, apically rounded. Abdomen horizontal or slightly oblique, about as long as last cruriger. Body with 1 or 2 short spine-setae in middle of each segment, and a few similar ones on ends of crurigers.

Chelifer scape longer than proboscis, divided into 2 subequal portions, hand as in *intermedia*, finger glabrous. Palpal tubercles conspicuous. Oviger as in *intermedia*, in ♂ 5th joint only slightly longer than 4th, 6th conspicuously swollen.

Legs 2nd coxa subequal to 1st + 3rd, femur longer than 1st tibia, 2nd tibia longer than femur, propodus without heel and not projecting over base of

claw, lower margin with 4 or 5 large spines proximally and 4-6 shorter ones distally, auxiliary claws strong, half length of main claw. Fine and short spine-setae on apices of coxal joints, scattered over femur and 1st tibia, more numerous on 2nd tibia. Cement duct on ventral surface of femur inconspicuous in ovig. ♂.

Body incl. abdomen ♂ 18, ♀ 16, proboscis ♂ 6.5, ♀ 6, 2nd leg ♂ 98 (2nd coxa 9, femur 25, 1st tibia 23, 2nd tibia 33), ♀ 75 mm. (resp. 7.5, 19, 17, 23).

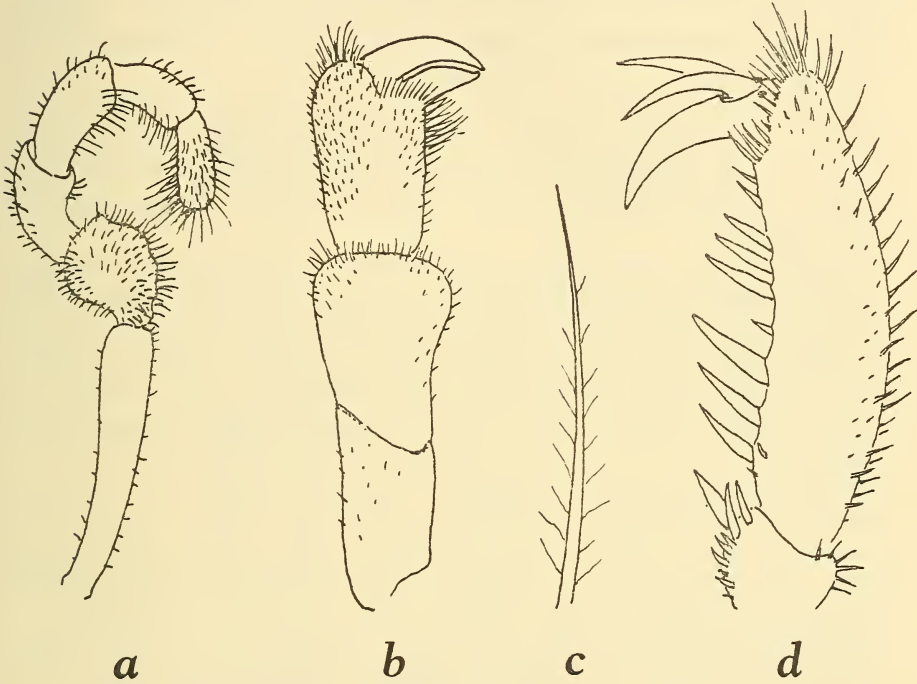


Fig. 16. *Pallenopsis intermedia* Flynn. a. distal joints of oviger ♂. b. chelifer. c. one of the longest tibial setae. d. propodus and claws of leg.

Localities: Table Mountain S. × E $\frac{3}{4}$ E., 58 miles, 190 fath. 1 ovig. ♂; Cape Point N. 16° E. 10 miles, 85 fath. 1 ♀; Cape St. Blaize N. × E. 73 miles, 125 fath. 1 non-ovig. ♂ (2nd leg 84 mm.). (S. Afr. Mus.)

Remarks. A ♀ specimen, off Tugela River mouth, 200 fath., resembles the above specimens in all characters mentioned, but is much more slender, resembling in fact the ♀ *brevidigitata* with which it was taken. Body incl. abdomen 10.5, 2nd leg 72 mm. (femur 17, 1st tibia 17, 2nd tibia 21); width of femur and 2nd tibia resp. 1 and .75 mm., as compared with 2 and 1.5 mm. in the above ♀ *capensis*. Except for the auxiliary claws and the terminal joint of oviger the specimen would be identified as *brevidigitata*.

Pallenopsis brevidigitata Möbius

Fig. 15b, c

1902. Möbius, loc. cit., p. 185, pl. 27, figs. 7-13.
 1928. Flynn, loc. cit., p. 19, fig. 9.
 1938. Calman, *John Murray Exp.*, v, p. 160.

Body segmented. Crurigers widely separated, at least twice as long as their own width, width across 2nd pair subequal to body length (excl. abdomen). Ocular tubercle short, conical, on extreme front of cephalon. Proboscis cylindrical, apically rounded. Abdomen horizontal, not extending as far as end of last crurigers. Dorsal surface glabrous.

Chelifer scape divided, 1st portion longer than (but not 'nearly twice as long as') 2nd, hand as in *intermedia*, finger glabrous. Palpal tubercles small. Oviger in ♀ 4th and 5th joints subequal, 6th slightly expanded, more so in ♂, 10th joint slender, apically tapering, with a single row of large spines on lower margin.

Legs 2nd coxa at least twice as long as 3rd, femur and 1st tibia subequal, 2nd tibia longer, propodus without heel and not projecting over base of claw, with large spines proximally on lower margin, followed by a comb-like series of smaller spines, claw three-quarters length of propodus, slender, auxiliary claws very short. Fine and short spine-setae, chiefly in 3 rows, on femur, 1st and 2nd tibiae. Cement duct on ventral surface of femur inconspicuous in ovigerous ♂.

Body incl. abdomen ♀ 9.5, proboscis 5, 2nd coxa 5, femur 16, 1st tibia 15, 2nd tibia 18 mm.

Localities: 29° 44' S. 31° 20' E. (off Durban), 46 fath. (Flynn); off Gwayang River, Mossel Bay, 31 fath. 1 damaged ♀; off Tugela River mouth, 200 fath. 1 damaged ♀; off Cape Natal, 54 fath. 2 ovig. ♂♂, 2 ♀♀ (S. Afr. Mus.).

Distribution. Off Dar-es-Salaam, 404 metres; Zanzibar area, 421-457 metres.

Remarks. All the South African Museum specimens are more or less damaged.

Calman refers to several discrepancies in Möbius's figures. Another inaccuracy occurs in fig. 7 which shows an extra (tibial) joint in the 2nd legs.

Pallenopsis (Rigona) ovalis Loman

Fig. 15d

1908. Loman, loc. cit., p. 68, pl. 10, figs. 137, 138.
 1923. Calman, loc. cit., p. 284, fig. 11.
 1928. Flynn, loc. cit., p. 23.
 1953. Stock, loc. cit., fig. 3 a (chart).

Body unsegmented. Crurigers contiguous at their bases. A more or less distinct median longitudinal rib on cephalon. Ocular tubercle short, conical,

anterior eyes scarcely larger than posterior pair. Proboscis cylindrical. Abdomen pointing obliquely upwards or nearly vertical. Dorsal surface glabrous.

Chelifer with scape undivided, hand as in *intermedia*, finger with a spinose pad on basal half (cf. *alcocki* Calman, loc. cit., fig. 9 c). Palpal tubercles distinct. Oviger in ♂ 5th joint slightly shorter than 4th, 6th slightly swollen, 10th joint as in *intermedia*.

Legs 1st coxa with 2 small spiniferous projections on upper apex, 2nd coxa distinctly longer than 3rd, femur and 1st tibia subequal or the latter slightly

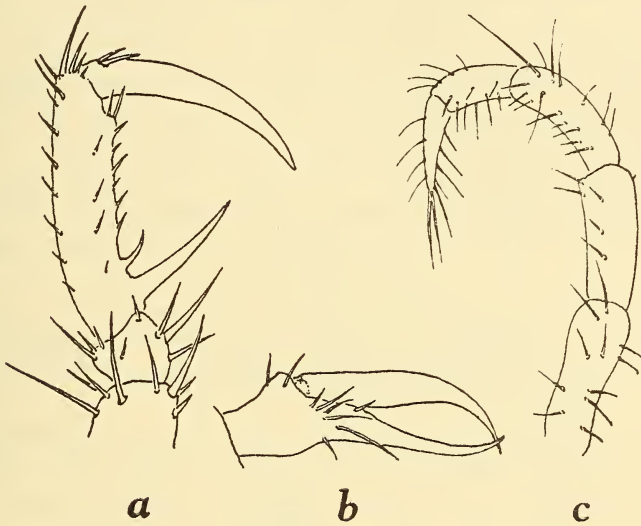


Fig. 17. *Pallenopsis oscitans* (Hoek). a. tarsus, propodus and claw of leg. b. hand of chelifer. c. distal joints of oviger ♀.

shorter, both with a small spiniferous process on upper apex, 2nd tibia longer than femur or 1st tibia and more slender; propodus, claw and auxiliary claws as in *intermedia*. Numerous short spine-setae on joints, and some longer ones arising from small tubercles on ventral surface of femur conspicuous in ovigerous ♂.

Body incl. abdomen 6, proboscis 3, femur 5.5, 1st tibia 5, 2nd tibia 6 mm. Another specimen, of which the body is damaged, has femur 7.5, 1st tibia 7, and 2nd tibia 8 mm.

Localities: 10 miles SE. of East London, 47 fath. 1 ovig. ♂; Algoa Bay, 25 fath. 1 ? ♂ (S. Afr. Mus.).

Distribution. East Indies, Andaman Is., Ceylon.

Pallenopsis oscitans (Hoek)

Fig. 17

1881. Hoek, *Rep. H.M.S. 'Challenger'*, iii, p. 89, pl. 13, figs. 1-5. (*Phoxichilidium o.*)

Body segmented. Crurigers well separated (by about their own width), each slightly longer than median width of body. Ocular tubercle low and rounded, eyes not traceable. Proboscis cylindrical, slightly tapering distally, apically rounded. Abdomen elongate, slender, slightly clavate, oblique. A few fine and rather long setae on the crurigers and abdomen.

Chelifer with scape a little longer than proboscis, 2nd joint slightly shorter than 1st, hand nearly as long as 2nd joint, palm short, finger and thumb distally slender, curved, when closed gaping, apices crossed. Palpal tubercles moderately large but inconspicuous. Oviger in ♀ 5th joint a little longer than 4th, 6th not swollen, apical joint slender, with long fine setae.

Legs 2nd coxa subequal to 1st + 3rd, femur very slightly longer than 1st tibia, 2nd tibia longer than femur, propodus without heel but with a very large spine basally, followed by smaller ones on lower margin, apex not projecting over claw, claw strong, reaching almost to base of propodus and forming with the large spine on the latter a prehensile 'chela', auxiliary claws short and weak. Fine setae on all joints, becoming more numerous on femur and 1st and 2nd tibiae but not forming dense fringes as in *intermedia*, nor a thick fur.

Body incl. abdomen 11.5, abdomen 4.75, proboscis 5, 2nd leg 47 mm. (2nd coxa 4, femur 11, 1st tibia 10, 2nd tibia 14 mm.).

Locality: off Cape Point, N. 86° E., 43 miles, 900-1,000 fath. 1 ♀ (S. Afr. Mus.).

Distribution. 38° 25' N., 35° 80' W. (Azores), 1,675 fath.

Remarks. Although the proboscis is more like that of *pilosa* as described by Hoek, and the legs are somewhat more hairy, there is little doubt that this specimen should be identified as *oscitans*; the apical joint of the oviger and the propodus of the legs, with its enormous basal spine, correspond with Hoek's figures. The ocular tubercle shows no trace of eyes, but the specimen has suffered desiccation.

Differs from *longirostris* Wilson in the apical joint of the oviger, and propodus; and from *tritonis* Hoek (syn. *holti* Carp.) in the same features and also in the relative lengths of palm and fingers of chelifer (see: Carpenter, *Fish. Irel. Sci. Invest.*, 1905, pl. 1, figs. 3, 4, 6, *holti*; I have not seen Hoek's 1883 paper).

P. calcanea Steph. 1933 differs in having the ovigers closer together, a much larger ocular tubercle, a shorter abdomen, a different apical joint on the oviger, propodus of legs with 2 moderate-sized basal spines on a distinct heel, and no auxiliary claws.

Pallenopsis sp. Gordon

1932. Gordon, loc. cit., p. 91, fig. 45.

A young specimen from 35° 14' S., 6° 49' E., pelagic, which Stephensen (loc. cit., p. 24) suggests may be the same as his *calcanaea* (loc. cit., p. 21, fig. 5) from Greenland. Gordon's record scarcely comes within the South African area.

Gen. *Hannonia* Hoek

1881. Hoek, *Rep. H.M.S. 'Challenger'*, iii, p. 92.
 1891. Sars, *Norw. N. Atl. Exp. Pycnogonida*, p. 6.
 1902. Pocock in Lankester, *Encycl. Brit.*, 10th ed. Arachnida (type of a separate family).
 1904. id., *Q. J. Micr. Sci.*, n.s. xlviii, p. 225 (reprint of 1902 article).
 1904. Loman, *Zool. Jahrb. Abt. Syst.*, xx, p. 385 (systematic position).
 1905. Cole, *Ann. Mag. Nat. Hist.*, (7) xv, pp. 408, 410 (systematic position).
 1908. Loman, loc. cit., pp. 15, 16, synopsis facing p. 19 (systematic position).
 1909. Thompson, *Cambr. Nat. Hist.*, iv, p. 533 (systematic position).
 1927. Calman, *Trans. Zool. Soc. Lond.*, xxii, p. 410 (systematic position).
 1947. Hedgpeth, *Smiths. Misc. Coll.*, cvi, p. 4.

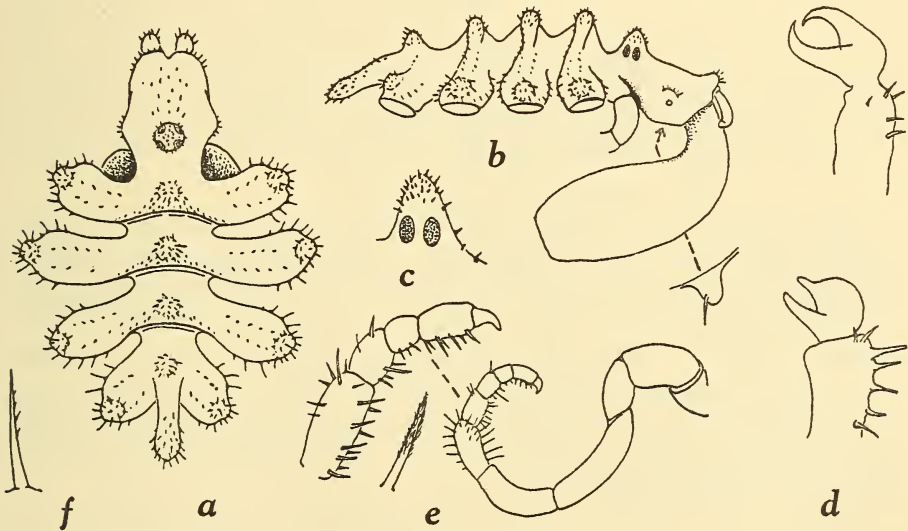


Fig. 18. *Hannonia typica* Hoek. a. dorsal view. b. lateral view, with tubercle (? vestigial palp) further enlarged. c. ocular tubercle of adult, from right side. d. chelifer of juvenile (above) and adult (below). e. oviger ♂ with distal joints further enlarged. f. spine from leg.

Body stout, segmented, crurigers narrowly separated. Proboscis on narrow stalk, swollen (sac-like), deflexed and bent beneath body. Chelifers rudimentary, 2-jointed, more or less chelate. Palps absent (see remarks). Ovigera

in both sexes, 10-jointed, not modified in ♂, with apical claw. Legs stout, tarsus very short, no auxiliary claws. Genital pores on last 2 legs in ♂, on all legs in ♀. Eggs in a single cake-like mass held by both ovigers. Femoral cement glands ♂ seemingly absent.

Remarks. An endemic South African genus with one species, whose systematic position has been the subject of much discussion.

The presence of the minute papilla, between the bases of the chelifers and ovigers, discovered by Calman (1927) is herewith confirmed. I have not, however, seen any indication in my specimens of its being 2-jointed. It is present in both sexes, lies just below a small spiniferous process on the side of the cephalic segment, and has a subapical spinule. It occurs in a juvenile specimen, 2.5 mm. body length (as measured below), but is neither more nor less feebly developed than in adults.

Calman's suggestion that this papilla represents the last vestige of a palp would seem to bring the genus into an intermediate position in the series *Böhmia-Rhynchothorax-Pycnogonum*, where Loman in his conspectus (1908) placed it. Calman did not accept Bouvier's suggestion that *Hannonia* was an Ammotheid. Hedgpeth (1947) places it in the *Pallenidae*.

Hannonia typica Hoek

Fig. 18

1881. Hoek, loc. cit., p. 92, pl. 14, figs. 8-11.
 1904. Loman, loc. cit., p. 383, pl. 14, figs. 12-15.
 1910. Hodgson, *Schultze. Reise*, iv, p. 227.
 1923. Loman, *Ark. Zool.*, xv, 9, p. 7.
 1927. Calman, loc. cit., p. 410.

Body compact, the posterior margins of the segments forming transverse arched ridges, each with a median boss. Crurigers separated by less than half their own width, their length subequal to or a little longer than median width of segments, each with a knob on dorsal apex. Ocular tubercle moderately high, bluntly conical, eyes distinct. Proboscis very much swollen beyond the comparatively narrow basal stalk. Abdomen extending beyond last crurigers, clavate, bent slightly downwards. Short spinules on the transverse ridges and bosses, crurigers, abdomen, top of ocular tubercle, and front and sides of cephalic segment.

Chelifers never quite vestigial, but variable, the chela sometimes well developed and apparently with mobile finger. Ovigers similar in both sexes, but in ♂ the distal joints rather stouter and more spinose, the spines minutely setulose.

Legs stout, 2nd coxa slightly longer than either 1st or 3rd, on last 2 legs in ♂ with a process on ventral apex, more conspicuous on 3rd than on 4th leg, femur slightly longer than either of the tibiae, which are subequal, tarsus narrower than 2nd tibia, propodus without heel, with numerous small but no

strong spines on lower margin, claw about one-third, or a little less, length of propodus. Numerous spines on the joints, arising from slightly raised tubercles, particularly distinct on dorsal surface of 2nd tibia, and especially in juveniles. Femoral cement glands ♂ seem to be absent; neither Loman (1904, p. 384) nor myself have found any.

Body (base of chelifers to base of abdomen) 5, proboscis 4, abdomen 2, 2nd leg femur 2.5, 1st and 2nd tibiae 2 mm.

Localities: Cape Town (Hoek, Loman); Lüderitzbucht (Hodgson); Port Natal (Durban) (Loman); Saldanha Bay and Melkbos Strand (Table Bay) littoral, Mossel Bay, 20 fath. (S. Afr. Mus.).

Remarks. Not nearly so common as *Discoarachne brevipes*; in the course of a considerable amount of shore-collecting at Sea Point (Table Bay) I have never found a specimen there, although on the other side of Table Bay (Melkbos Strand) it is moderately common.

Two ovigerous ♂♂ were collected at Saldanha Bay in September.

Fam. PHOXICHILIDIIDAE

1908. Loman, *Siboga Exp.* monogr., xl, p. 62, conspectus facing p. 19.
(*Phoxichilidae*.)
1913. Schimkewitsch, *Zool. Anz.*, xli, p. 611.
1947. Hedgpeth, *Smiths. Misc. Coll.*, cvi, p. 4.

Octopodous. Body segments free or fused. Chelifers well developed, chelate. Palps rudimentary, reduced to tubercles or absent. Ovigera in ♂ only, 5-9-jointed, with simple spines. Legs usually with auxiliary claws.

Key to South African Genera

- | | |
|---|-----------------------|
| 1. Cephalic segment short, without neck. Oviger 5-jointed. | <i>Phoxichilidium</i> |
| 2. Cephalic segment with distinct neck; ocular tubercle near front margin.
Oviger 6-jointed. | <i>Anoplodactylus</i> |

Gen. *Phoxichilidium* M.-Edw.

1836. Johnston, *Miscell. Zool.*, i, Mag. Zool. & Bot., i, p. 378. (*Orithyia*, preocc. Fabr. 1798.)
1840. Milne-Edwards, *Hist. Nat. Crust.*, (Roret's Suite à Buffon. Crust.), iii, p. 535.
1881. Hoek, *Rep. H.M.S. 'Challenger'*, iii, p. 31 (part).
1908. Loman, *Siboga Exp.* monogr., xl, pp. 63, 64.

Body segments free. Ocular tubercle on anterior portion of cephalic segment, in advance of 1st crurigers. Chelifers with scape undivided, finger and thumb gaping when closed. Palps completely absent. Ovigera (♂ only) 5-jointed. Legs with minute auxiliary claws. Genital pores on last 2 legs in ♂, on all legs in ♀.

Phoxichilidium capense Flynn.

1928. Flynn, loc. cit., p. 27, figs. 15, 16.

Body stout, especially the cephalic segment and 1st pair of crurigers. Crurigers narrowly separated (the 3rd and 4th pairs more widely separated). Ocular tubercle obtusely conical, eyes distinct. Abdomen rather short and stout, erect. Proboscis stout, apically truncate.

Chelifer rather stout, as long as proboscis, hand (palm) longer than broad, finger and thumb curved, inner margins entire.

Legs (♀) stout, 2nd coxa with strong conical projection (bearing the genital pores) on ventral apex, femur longer than either of the tibiae, which are subequal (text; according to the measurements and figure the 1st tibia is slightly the longer), propodus with strong spines on heel, lower margin with about 12 spines, claw strong, auxiliary claws minute.

Body 3.75, proboscis 3.18, femur 5.17, 1st tibia 4.31, 2nd tibia 3.75 mm. (Flynn).

Locality: Hout Bay, west coast of Cape Peninsula, depth not given (Flynn). Known from a single ♀.

Gen. *Anoplodactylus* Wilson1821. Say, *J. Ac. Nat. Sci. Philad.*, ii, p. 59. (*Anaphia*.)1878. Wilson, *Amer. J. Sci.* (3), xv, p. 200.

1908. Loman, loc. cit., p. 71.

1908. Norman, *J. Linn. Soc. Lond.*, xxx, p. 202. (*Anaphia*.)1912. Loman, *Bull. Inst. ocean. Monaco*, no. 238, p. 7. (subgen. *Halosoma* Cole).1923. Calman, *Rec. Ind. Mus.*, xxv, p. 285.1927. id., *Trans. Zool. Soc. Lond.*, xxii, pp. 405, 407.

Body segments free. Ocular tubercle on front margin of cephalic segment overhanging base of proboscis. Chelifer with scape undivided, finger and thumb either stout and meeting when closed, or slender and gaping. Palps completely absent. Ovipiger 6-jointed, ultimate and penultimate joints feebly developed, without strong spines, no apical claw. Legs with or without auxiliary claws. Genital pores on last 2 legs in ♂, on all legs in ♀ (but see Calman, 1927). Femoral cement glands ♂ on femur usually single, tubular (numerous and cribriform in *cribellatus* Calman, 1923).

Remarks. Wilson's genus is said to be the same as *Anaphia* Say, but this synonymy has not been generally adopted.

Möbius's South African species *spinus* has been transferred to *Parapellene*.

Key to the South African Species

1. Hand of chelifer stout, finger and thumb short, meeting when closed. *aculeatus*
2. Hand of chelifer slender, finger and thumb long, slender, gaping when closed. *pelagicus*

Anoplodactylus aculeatus Möbius

1902. Möbius, *D. Tiefsee Exp.*, iii, p. 188, pl. 28, figs. 1-7.

Body slender. Crurigers separated by intervals not greater than their width, their length subequal to median width of segments. Ocular tubercle conical, sharply pointed, eyes distinct. Abdomen short, vertical.

Chelifer scape stout, longer than proboscis, with conical process on dorsal apex, hand stout, finger and thumb short, stout, meeting when closed.

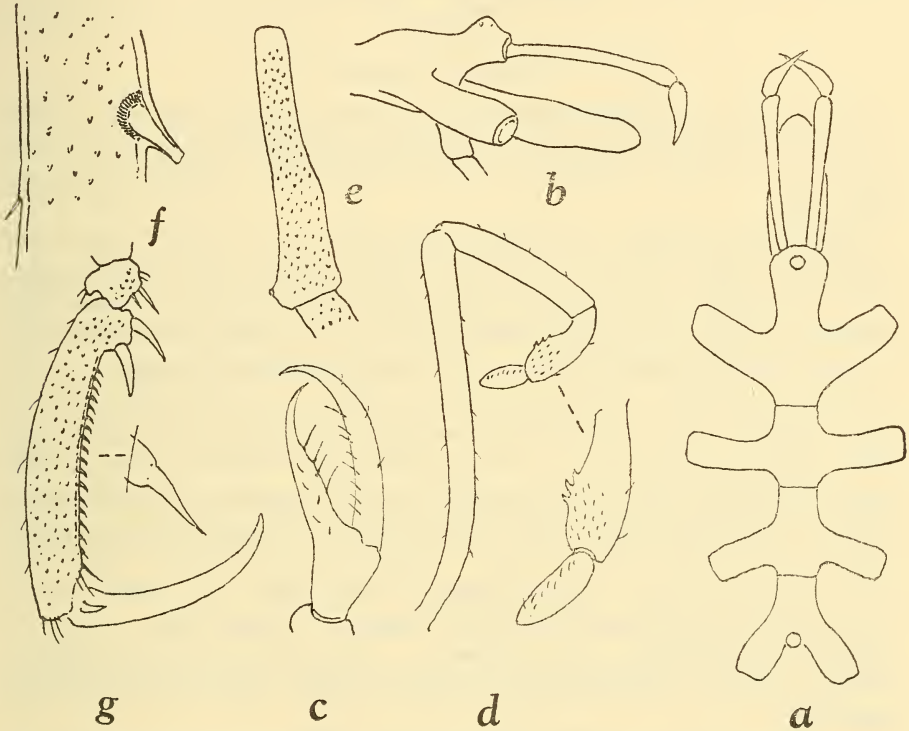


Fig. 19. *Anoplodactylus pelagicus* Flynn. a. dorsal view. b. lateral view of cephalic segment. c. hand of chelifer. d. 3rd-6th joints of oviger ♂ with 5th and 6th joints further enlarged. e. 2nd coxa of leg with genital pore. f. cement gland on femur. g. tarsus, propodus and claw of leg.

Legs long, 2nd and 3rd coxae with a spiniform process on ventral apex, femur longer than 1st tibia, both joints with a spiniform process on dorsal apex, 1st tibia also with a spine at end of basal third of its length, 2nd tibia longer than femur (subequal in fig. 1), sparsely setose, propodus with 4 large spines on basal heel and 8 smaller ones on lower margin, claw strong, no auxiliary claws.

Body, excl. abdomen, about 8 mm. (according to Möbius's fig. 1).

Locality: Agulhas Bank, 126 metres, 2 ♀♀ (Möbius).

Remarks. This species, based on the female only, is very like *insignis* (Hoek) 1881, based on the ♂, from Bahia, S. America. Both have projections on the chelifer scape, 2nd and 3rd coxae, femur and 1st tibia; but *insignis* has also a process on the 1st coxa, and the crurigers are a little more widely separated. Cf. also *insignis* subsp. *bermudensis* Cole (1904. *Proc. Boston. Soc. Nat. Hist.*, xxxi, p. 325, pl. 20, and pl. 22, figs. 21-29).

Anoplodactylus pelagicus Flynn

Fig. 19

1928. Flynn, loc. cit., p. 25, fig. 14.

Body slender. Crurigers separated by intervals greater than their width, their length greater than median width of segments. Ocular tubercle low and flattened or rounded on top, eyes small, unpigmented. Abdomen not very long, erect.

Chelifer scape slender, extending a little beyond tip of proboscis, hand with long slender finger and thumb, curved and gaping when closed, inner margins with a few spine-setae. Oviger 3rd joint longer than 2nd, both elongate, 5th somewhat swollen, with a patch of setae distally and 3 small recurved denticles on inner margin, 6th shorter than 5th, ovate, setose on inner margin.

Legs long, slender, ventral apex (with genital pore) of 2nd coxa of last 2 legs ♂ slightly more prominent than on first 2 legs; femur and 1st and 2nd tibiae subequal, 2nd tibia in the S.A.M. specimen not so much more slender than 1st tibia as is shown in Flynn's figure, and the propodus not so noticeably thicker, 2 strong spines on basal heel and about 18 small spines on inner margin, claw strong, auxiliary claws very small (scarcely visible except when claw is seen in dorsal or ventral view); tibiae finely and sparsely setose. Cement gland on dorsal surface of femur tubular, not very long.

Body, excl. abdomen, ♂ 2.5, proboscis 1.5, femur (also 1st and 2nd tibiae) 2.75 mm. Flynn's measurements are slightly greater, except the leg measurements of ♂.

Localities: off Port Natal (Durban), pelagic (Flynn); Cape Point NE. × E $\frac{3}{4}$ E. 28 miles, 300 fath. 1 ♂ (S. Afr. Mus.).

Remarks. Flynn refers (loc. cit., p. 3) to the capture of 7 specimens in a tow-net, but in the absence of further data it does not follow that they were from the surface or even pelagic: the tow-net may have been attached to the beam of the trawl. The single specimen in the South African Museum was taken together with 'Alcyonarians' (s.s. *Pieter Faure* log-book, P.F. no. 18159).

'*Pallene*' *lappa* Böhm

1879. Böhm, *MB. K. Ak. Wiss. Berlin*, p. 182. Ibo, Mozambique.

1881. Hoek, loc. cit, p. 31.

1910. Hodgson, loc. cit., p. 225.
 1912. Loman, *Bull. Inst. ocean. Monaco*, no. 238, p. 6.
 1928. Flynn, loc. cit. p. 4.

Hoek and Hodgson considered that Böhm's specimen was immature, with not fully developed ovigers. Loman, with whom Flynn agrees, included it in *Halosoma*, a subgenus of *Anoplodactylus*. Loman gives as one of the characters of *Halosoma*: ovigers 6-jointed; but Flynn says Böhm's specimen has 7-jointed ovigers.

The locality is, strictly speaking, outside (12° S.) the South African area, but the record is included here as Flynn has referred to it.

Fam. ENDEIDAE

1908. Norman, *J. Linn. Soc. Lond.*, xxx, p. 231.
 1932. Gordon, '*Discovery*' *Rep.*, iii, p. 93.

See generic characters.

Gen. *Endeis* Phil.

1843. Philippi, *Arch. Naturg. Jahrg.*, ix, p. 175.
 1902. Möbius, *D. Tiefsee Exp.*, iii, p. 195. (*Phoxichilus*, non Latr.)
 1902. Stebbing, *Knowledge*, xxv, p. 187. (*Chilophoxus*.)
 1908. Loman, *Siboga Exp. monogr.*, xl, p. 77. (*Phoxichilus*, non Latr.)
 1908. Norman, loc. cit., p. 231.
 1915. Calman, '*Terra Nova*' *Exp. Rep.*, iii, p. 48.
 1923. id., *Rec. Ind. Mus.*, xxv, p. 290.

Octopodous. Body segmented. No chelifers. No palps. Ovigers only in ♂, 7-8-jointed, without apical claw, with simple spines. Legs with auxiliary claws.

Key to the South African Species

1. Crurigers narrowly separated. Propodus of legs apically produced over base of claw. *clipeatus*
 2. Crurigers well separated. Propodus of legs not apically produced. *mollis*

Endeis clipeatus (Möbius)

Fig. 20

1902. Möbius, loc. cit., p. 196, pl. 30, figs. 6-10. (*Phoxichilus clipeatus* [*sic*]; *clipeatus* on plate.)
 1928. Flynn, loc. cit., p. 29.

Body rather stout, cephalic segment with front margin feebly bilobed, with a minute chitinous point on each lobe in the ♂ specimen (possibly representing the remnants of the chelifers). Crurigers narrowly separated, about as long as median width of segments. Ocular tubercle short, conical. Abdomen about as long as last crurigers, apically notched. Proboscis stout, swollen in middle, apex truncate. Body and crurigers glabrous. Whole surface of body and appendages closely and minutely 'pitted' (? glandular).

Oviger 8-jointed, but articulation between 7th and 8th joints obscure, 6th joint with a variable number of more or less recurved spines on inner margin.

Legs, femur and 2nd tibia subequal, 1st tibia slightly shorter, propodus apically produced in a cylindrical process over base of the claw, claw and auxiliary claws strong. Glabrous. Femoral cement glands about 40 in a single row.

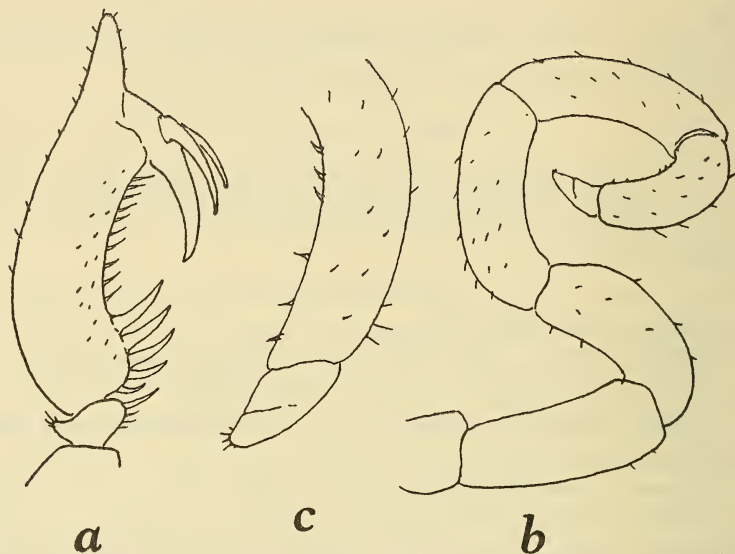


Fig. 20. *Endeis clipeatus* (Möbius). *a.* tarsus, propodus and claw of leg. *b.* oviger ♂. *c.* 6th and 7th-8th joints of same further enlarged.

Body (♂) incl. abdomen 4, proboscis 3, 2nd leg 20 mm. (femur 5, 1st tibia 4.25, 2nd tibia 5.25 mm.). Yellowish, a red line down middle of body and red longitudinal lines on legs.

Localities: St. Francis Bay, shallow water (Möbius); off west coast of Cape Peninsula (Flynn); St. James, False Bay, littoral. 1 juv.; west coast of Cape Peninsula, littoral; False Bay, 10 fath. and Algoa Bay, 52-63 fath. 2 ♀♀, 1 ♂ (S. Afr. Mus.).

Endeis mollis (Carp.)

Fig. 21

1894. Carpenter in Herdman's *Ceylon Pearl Fish. Rep. Suppl. Rep.*, xiii, p. 182, pl. figs. 1-7.
 1907. id., *Trans. Linn. Soc. Lond.* (2) zool. xii, p. 98.
 1923. Calman, loc. cit., p. 293, fig. 16.
 1927. id., *Trans. Zool. Soc. Lond.*, xxii, p. 408.
 1938. id., *John Murray Exp.*, v, p. 160.
 1951. Stock, *Mem. Inst. Roy. Sci. Nat. Belge.* (2) fasc. 43, p. 17, figs. 23, 24.

Body rather slender, cephalic segment with 2 rounded lobes in front over base of proboscis (possibly representing the chelifers). Crurigers separated by more than their own width, slightly longer than median width of segments. Ocular tubercle short, conical. Abdomen slightly longer than last crurigers, oblique. Proboscis stout, swollen in middle, apex truncate. Body and crurigers glabrous. Whole surface of body and appendages closely 'pitted' (? glandular).

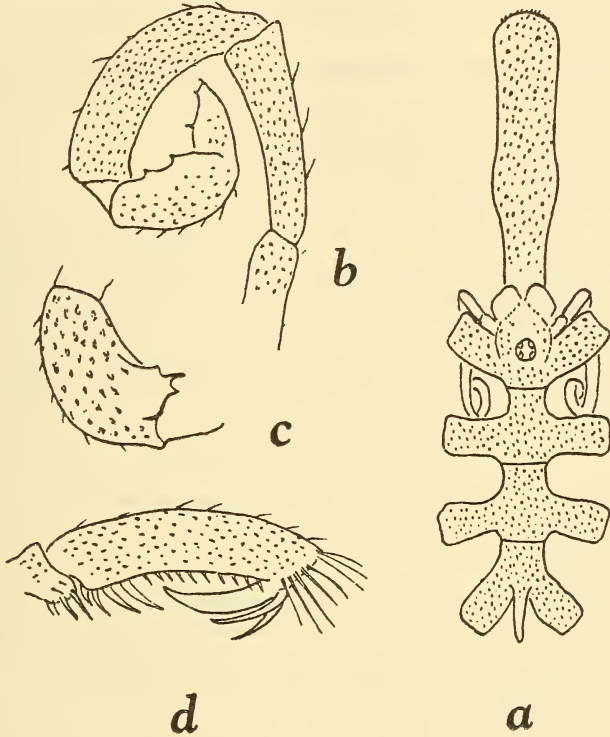


Fig. 21. *Endeis mollis* (Carp.). a. dorsal view. b. inner view of 4th-7th joints of oviger ♂. c. outer view of 6th joint of same. d. propodus and claw of leg.

Oviger 7-jointed, on a basal knob, penultimate joint swollen, inner margin on inner side (as coiled up *in situ*) with 2 recurved spinules, outer surface with a broad lobe bearing 3 spinules, apical joint with 1 spinule on inner margin and 2-3 on apex.

Legs, femur slightly longer than 1st tibia, smooth, cylindrical, with one fairly strong spine-seta and 2 smaller setae on dorsal apex, 2nd tibia slightly longer than femur, 1st and 2nd tibiae with a few scattered setae, propodus apically truncate, not produced over base of claw. Femoral cement glands about 23, in a single row.

Body (tip of proboscis to tip of abdomen) ♂ 7.5, 2nd leg 18 mm. (femur 4.5, 1st tibia 4, 2nd tibia 4.75 mm.).

Locality: off Durnford Point, Zululand, 13 fath. 1 non-ovig. ♂, 1 ♀ (S. Afr. Mus.).

Distribution. Ceylon, Maldives, Arabian coast, Indian coasts, Nicobars, Christmas Island, Tonga Is.

Remarks. Apparently resembles the typical form. Calman records some variations in the shape of the femur, number of cement glands, etc.

Fam. AMMOTHEIDAE

1908. Loman, *Siboga Exp. monogr.*, xl, conspectus facing p. 19 and p. 49.
 1909. Thompson, *Cambr. Nat. Hist.*, iv, p. 534.
 1913. Schimkewitsch, *Zool. Anz.*, xli, p. 612.
 1947. Hedgpeth, *Smiths. Misc. Coll.*, cvi, p. 4.

Octopodous. Body extended or compact, segmented or the segmentation more or less obsolete. Proboscis more or less movable, directed forwards or downwards. Chelifers reduced, chelate in juvenile, but rudimentary in adult. Palps 6-10-jointed (*Nymphonella* 17-20). Ovigigers in both sexes, (9)-10-jointed, with or without apical claw, with simple or serrate spines. Legs usually with auxiliary claws. Genital pores on all legs in ♀, on last 2 legs in ♂. Eggs in several masses.

Key to the South African Genera

- I. Proboscis fusiform or subcylindrical, directed forwards or downwards.
- A. Palp 7-jointed. *Böhmia*
 - B. Palp 8-jointed. *Achelia*
 - C. Palp 9-jointed.
1. All body segments fused. Crurigers narrowly separated. *Nymphopsis*
2. Body segments, at least the anterior ones, distinct. Crurigers widely separated.
- a. Legs with auxiliary claws. Ocular tubercle very elongate. *Kyphomia*
 - b. Legs without auxiliary claws. *Ainigma*
- II. Proboscis flask-shaped, curving downwards. *Austroraptus*

Gen. *Böhmia* Hoek

1881. Hoek, *Rep. H.M.S. 'Challenger'*, iii, p. 24.
 1902. Möbius, *D. Tiefsee Exp.*, iii, p. 189.
 1908. Loman, loc. cit., conspectus facing p. 19.
 1947. Hedgpeth, loc. cit., p. 4 (in list of genera).

Body stout, segmented, arched. Crurigers narrowly separated. Proboscis elongate, conical, inserted ventrally and bent under cephalic segment. Chelifers rudimentary, 2-jointed, chelate, inserted ventrally and invisible from above. Palps 7-jointed. Ovigigers 10-jointed, with apical claw, not modified in ♂. Legs stout, tarsus very short, no auxiliary claws. Genital pores on all legs in ♀, on last leg in ♂. Pale non-spinose (or almost so) areas on dorsal surface of all femora in ♂. Eggs carried in a single cake-like mass.

Remarks. An endemic South African genus, with two species.

Flynn (loc. cit.) claimed to have found genital pores on the *dorsal* surface of the 2nd coxa of all the legs; this position would be distinctly unusual, in fact unique, if it were correct. My own observations disprove this; the genital pores are in the normal ventral position, and on the last leg only (as in *Pycnogonum*).

Key to the South African Species

1. Smaller species. Legs not more than twice as long as body. Tubercles distinct, but moderate. Cephalic segment parallel-sided or widening in front. Femur 2 (♀) or 3 (♂) times as long as wide. *chelata*
2. Larger species. Legs about four times as long as body. Cephalic segment narrowing in front. Femur (♂) four and a half to five times as long as broad. *tuberosa*

Böhmia chelata (Böhm)

Fig. 22

1879. Böhm, *MB. Ak. Wiss. Berlin*, p. 192, pl. 2, figs. 5-5d. (*Pycnogonum c.*)

1881. Hoek, loc. cit., p. 24.

1902. Möbius, loc. cit., p. 189, pl. 28, fig. 15 (front of cephalic segment).

1909. Schimkewitsch, *Zool. Anz.*, xxxiv, p. 3, fig. 1 A and C (chelifer and palp).

1915. Calman. '*Terra Nova*' *Exp. Rep. Zool.*, iii, p. 13 (oviger mentioned).

1928. Flynn, loc. cit., p. 30, fig. 17.

Body strongly arched, median portion of each segment raised into a rounded boss, similar to the ocular tubercle, the boss on 4th segment smaller than the others, all sharper and more pronounced in ♂ than ♀; cephalic segment nearly parallel-sided in ♀ with somewhat prominent rounded antero-lateral corners, in ♂ sides diverging forwards, antero-lateral corners prominently and subacutely produced. Crurigers narrowly separated, the last pair a little more widely separated; dorsal apices tending, especially in ♂, to form small nodiform bosses. Ocular tubercle conical apically rounded in ♀, subacute in ♂, eyes not conspicuous. Proboscis inserted ventrally, base wide, quickly tapering to a subacute apex, projecting downwards or bent under cephalic segment. Abdomen projecting beyond last crurigers, clavate, deflexed. Whole surface reticulate, with short spinules arising from conical bases, including ocular tubercle.

Chelifer scape stout, spinose, chela rather slender, but well developed and apparently functional (finger mobile). Palp 4th joint much the longest, 5th small, 6th and 7th rather slender, more so in ♂ than ♀, spinose.

Oviger 5th joint longer than 4th, last 4 joints with rather strong spines on inner margins, mostly in pairs, resp. about 8, 5, 4, 5 pairs, sometimes fewer in ♂, inner apex of 10th joint in ♂ with a single unguiform process resembling but smaller than the apical claw; alike in both sexes except for this latter feature.

Legs stout, stouter in ♀ than ♂, decreasing in length backwards, the 3 coxae subequal in length, but 2nd somewhat stouter in ♀ owing to the genital pores,

on last leg in ♂ a little longer than either of the other two; femur longer than 1st tibia on all legs in ♀, subequal to it in ♂ or on the 1st leg slightly shorter, about twice as long as wide in ♀, about 3 times in ♂, 2nd tibia subequal to femur in ♀, slightly longer in ♂, tarsus and propodus together a little shorter than 1st tibia, propodus without heel, with several short but stout spines along lower margin, claw about half length of propodus. Surface reticulate like that of the body, and spinulose. At dorsal apex of 2nd coxa of all legs in *both sexes*

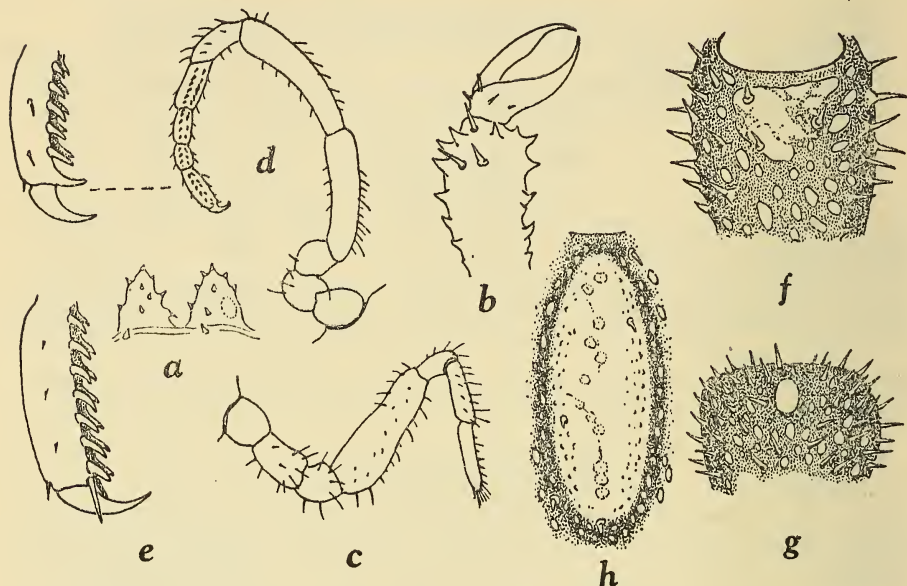


Fig. 22. *Böhmia chelata* (Böhm). a. abnormal double ocular tubercle. b. chelifer. c. palp. d. oviger ♂ with apex of 10th joint and claw further enlarged. e. apex of 10th joint and claw of oviger ♀. f. dorsal apex of 2nd coxa (♂♀) of leg. g. ventral apex of 2nd coxa of last leg ♂. h. dorsal surface of femur of ♂ with pale patch ('cement gland').

a small pale spot. Femoral cement gland in ♂ an elongate oval pale spot on dorsal surface on each leg.

Eggs in a single cake-like mass.

Body (from front margin of cephalic segment to base of abdomen) ♂♀ 5.5, proboscis 2.5, abdomen ♂ 2, ♀ 1.5, 1st leg (without claw) approx. ♂ 10, ♀ 8.5 mm. Amber-coloured, or reddish-brown, sometimes bicoloured dark and light, with dark bands on legs (see under Remarks).

Localities: (loc. ? Böhm); St. Francis Bay, shallow water (Möbius); off Ball Point, Cape Town (Flynn); False Bay, littoral to 12 fath.; off Cape St. Blaize, off Knysna, and off Cape St. Francis, 25-70 fath.; off Gt. Fish Point, Keiskamma, East London and Cape Morgan, 33-77 fath.; off Umtwalumi and Umhloti River mouths (Natal), 25-40 fath.; off Tugela River and Durnford Point (Zululand), 13-47 fath. ♂♂, ♀♀, juv. (S. Afr. Mus.).

Remarks. On two points my observations differ from those of Flynn. The more important is the position of the ♂ genital pores. Although Flynn had both ♂♂ and ♀♀ he did not notice that the pale spot on *dorsal* apex of 2nd coxa occurred in both sexes. It is obviously not a genital pore. When the integument of this joint is treated with a clearing reagent the pale spot is seen to be due to feeble chitinization; elsewhere the integument is strongly but not uniformly chitinized, producing a reticulate pattern (fig. 22*f*). Further proof that these pale spots are not openings is shown by the fact that spines may be present on them as elsewhere on the integument.

The true genital pore in ♂ is a very definite opening, in the normal position on the *ventral* surface of the 2nd coxa, and it occurs only on the last leg.

On the upper surface of the femur of all the legs is another pale patch, oval in shape and very conspicuous, but which occurs only in the ♂. Flynn calls this the cement gland, and it probably is; but I have failed to find the longitudinal slit-like opening described by him (cf. also under *tuberosa*). The paleness of the patch is due to lack of chitinization, as in the case of the spot on 2nd coxa; and there are minute spinules and even a few spines on its surface, if not centrally at least marginally. Some small circular structures (fig. 22*h*) may be the actual cement glands, but I cannot detect any individual or communal pores.

The chelate termination of the oviger was mentioned incidentally by Calman (1915), but he did not state that it is found in the male only.

This species is common on branching Alcyonarians (*Gorgonia*, *Melitodes*, *Spongioderma*, *Villogorgia*, *Wrightella*, etc.) but I have also found it in the littoral zone among Hydroids and Polyzoa.

With such a typically warm-water distribution (Zululand southwards), Flynn's record 'Ball Point, Cape Town' is a little surprising, if this locality really is in Table Bay. I have not been able to trace Ball Point on any chart. I have not taken *Böhmia chelata* either at Sea Point or at Melkbos Strand (both in Table Bay), but it is fairly common at low tide at St. James, False Bay. It is, however, a more frequent inhabitant of Alcyonarians, and nearly every piece of 'Fan-coral' (*Gorgonia flamma*) which I have examined in a fresh state, has one or more of these little Pycnogonids clasping its branches.

Coloration. As a rule the animal is uniformly coloured, irrespective of the colour (white, yellow, pink, red) of the Alcyonarian on which it is found. Two lots, however, from the Keiskamma-Cape Morgan area are bicoloured and very striking. The ground colour is the usual amber or yellowish-brown with dark umber-brown on parts of the body and legs as follows: on the body the dark colour occupies the whole upper surface except the antero-lateral corners of the cephalic segment, ocular tubercle, and a patch behind it, the 4 dorsal tubercles, and the apical bosses on the crurigers; the abdomen has a dark streak on each side; on the legs the 1st coxa is dark, dorsally only in juvenile, but also ventrally in adult. The 2nd coxa is dark dorsally with a slight suffusion ventrally in adult; the femur and 1st tibia each with a dark

band in distal half on dorsal surface only. The pale spots on the 2nd coxae (δ^{f}) and the cement gland (δ) remain pale.

One of these lots is recorded as being found on a 'yellow Alcyonarian', and the piece preserved with the Pycnogonid is *Wrightella fragilis*. In the preserved state this Alcyonarian is white with the nodes yellow or brownish, but whether the two colours are distinct in life is not recorded.

Aberration. One δ (Somerset Strand, False Bay) has the ocular tubercle divided into two tubercles placed transversely; one of the eyes seems to be

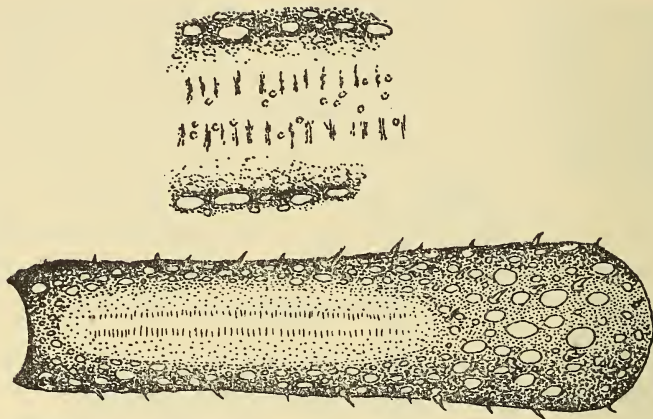


Fig. 23. *Böhmia tuberosa* Möbius. Dorsal surface of femur of δ showing pale patch ('cement gland'), with a portion of the latter further enlarged; semidiagrammatic, minor reticulation omitted.

present, but the others could not be traced. For rarity of abnormalities in Pycnogonids see Gordon, 1932. 'Discovery', Rep., vi, p. 131.

Böhmia tuberosa Möbius

Fig. 23

1902. Möbius, loc. cit., p. 189, pl. 28, figs. 13, 14.

1909. Schimkewitsch, loc. cit., p. 3, fig. 1 B and D (chelifer and palp).

δ —similar to *chelata*, but the ocular tubercle, antero-lateral processes of cephalic segment, median bosses on segments and those on apices of crurigers all very prominent and sharply conical, the median boss on 4th segment lower than the others. Sides of cephalic segment somewhat convergent. Surface reticulate and spinulose as in *chelata*.

Chelifer and palp as in *chelata*, but in the latter the 7th joint is shorter than the 6th. Oviger as in *chelata*, but the pairs of spines on last 4 joints more numerous, resp. about 10, 8, 6, 9; and 10th joint without an unguiform process on lower apex.

Legs longer and more slender than in *chelata*; 2nd coxa a little longer than either 1st or 3rd, femur a little longer than 1st tibia, about five times as long as broad, 2nd tibia a little longer than femur, rather slender and tapering so that tarsus is very little narrower than its apex, tarsus and propodus two and a half to three times in length of 2nd tibia, propodus without heel, with numerous spines on lower margin, claw a little more than one-third (but not quite half) length of propodus (Möbius, fig. 14: half length of propodus). Surface reticulate and spinulose, with pale spot on dorsal apex of 2nd coxa of all legs. Femoral cement gland an elongate-oval pale patch on dorsal surface of femur in all legs. Genital pore on ventral apex of 2nd coxa of last leg only.

Body (front margin of cephalic segment to base of abdomen) 6, proboscis 4, abdomen 3, 2nd leg (without claw) approx. 23 mm. (femur 6, 1st tibia 5, 2nd tibia 7 mm.). Reddish-brown.

Localities: Agulhas Bank, 154 metres 1 ♂ (Möbius); off East London, 250-300 fath. 1 non-ovig. ♂ (S. Afr. Mus.).

Remarks. The 'Valdivia' specimen was a ♂ (dorsal patches) 7 mm. in length including abdomen. There is an obvious discrepancy in the length of the claw on the legs in Möbius's two figures; as fig. 14 shows a claw half length of propodus and therefore not so very different from that of the specimen above described, one must regard the long slender claws in the picture of the whole animal (fig. 13) as fanciful.

With a body length of 7 mm. incl. abdomen, the 2nd leg of the 'Valdivia' specimen was 13 mm. long; the present specimen measuring 9 mm. incl. abdomen has the 2nd leg 23 mm. long.

The remarks on the pale coxal spot and femoral patches and the position of the ♂ genital pore made under *chelata* apply here also. With the greater length of femur, the femoral patch is more elongate. The patch itself is paler than the rest of the integument, but there is a still paler line down the centre of it, as seen under a moderate magnification. This is not due to a slit-like opening, but to a double series of minute transverse 'marks' (fig. 23). Their real structure is doubtful, but they appear to be *in* the substance of the chitin as they are not obliterated by rubbing a needle-point over them either on the external or internal surface. (Schimkewitsch, loc. cit., p. 4, called them: Internal trabeculae.) Scattered over the pale area are a number of minute 'glands', smaller and more numerous than those in *chelata*. These can be removed by rubbing the internal surface.

Gen. *Achelia* Hodge.

- ? 1838. Costa, *Fauna Regn. Napoli. Arachn. Trachn.*, p. 7. (*Phanodemus*.)
 1864. Hodge, *Rep. Brit. Assoc.*, xxxiii, Not. misc., p. 102 and *Ann. Mag. Nat. Hist.* (3) xiii, p. 114.
 1881. Hoek, *Rep. H.M.S. 'Challenger'*, iii, p. 26.
 1881. Dohrn, *F. Fl. Golf. Neapel.*, iii, pp. 133, 225, 227, 228 (*Ammothea*, non Leach).

1891. Sars, *Norw. N. Atl. Exp. Pycnogonidae*, p. 120. (*Ammothea*, non Leach.)
 1908. Loman, *Siboga Exp. monogr.*, xl, pp. 10, 11 and synopsis facing p. 19.
 (*Ammothea*, non Leach.)
 1913. Bouvier, *2me Exp. Antarct. Franc.*, pp. 45, 46, 138.
 1915. Calman, '*Terra Nova*' *Exp. Zool.*, iii, p. 56.
 1917. Bouvier, *Res. Sci. Camp. Monaco*, li, p. 38. (*Ammothea* subg. *Achelia*.)
 1927. Hodgson, *D. Südpol Exp.*, xix (zool. xi), p. 344.
 1932. Gordon, '*Discovery*' *Rep.*, vi, p. 110.
 1938. Calman, *John Murray Exp.*, v, p. 160.
 1938. Gordon, *Austral. Antarct. Exp.*, C II, 8, p. 22.

Body compact, segmented, but segments more or less fused. Crurigers contiguous or narrowly separated. Ocular tubercle near front margin of cephalic segment. Proboscis large, fusiform, directed forwards. Chelifer with single-jointed scape, and terminal more or less bifid joint, which in juvenile forms a small but functional chela. Palp 8-jointed, more or less geniculate, 2nd and 4th joints longest. Oviger 10-jointed, in both sexes, 7th-10th joints each with 1 (or 2) pinnate or doubly-serrate spines, without apical claw.

Legs moderate, tarsus small, propodus strongly spinose on lower margin, claw strong, auxiliary claws moderate or strong. Genital pores on all legs in ♀, on last two legs in ♂, at apices of conical processes. Femoral cement gland ♂ single, opening near dorsal apex.

Remarks. Since *Leionympha* Möbius was shown to be the same as *Ammothea* Leach, the small, compact, shallow-water species formerly included in the latter genus, are now put into *Achelia*. Bouvier (1913 and 1917), however, uttered a warning against regarding this name as stable, suggesting (as did Dohrn) that *Phanodemus* was the earliest generic name for these forms.

Key to the South African Species

1. Abdomen extending beyond last crurigers.
2. Abdomen not extending beyond last crurigers

quadridentata
brevicauda

Achelia quadridentata (Hodgson)

Fig. 24

1910. Hodgson, *Schultze. Reise*, iv, p. 223, figs. 2, 3 (palp, oviger).

Body compact, widest in front, narrowing posteriorly, cephalic segment large, segments 3 and 4 fused, and abdomen apparently not marked off by a suture. Crurigers contiguous, each with a conical tubercle on upper apex. Proboscis as long as body with abdomen, broadly fusiform. Ocular tubercle on front margin of cephalic segment, conical, eyes distinct. Abdomen extending to end of 1st coxa of last leg.

Chelifer scape undivided, the terminal joint representing the chela feebly bifid. Palp geniculate, 2nd and 4th joints longest, distal joints setose. Oviger

5th joint longest, 7th, 8th and 9th joints each with one doubly-serrate (pinnate) spine, 10th joint with 2 similar spines, one laterally and one apical; alike in the two sexes, but that of ♂ rather stronger.

Legs without processes, 1st coxa with a small setiferous tubercle on posterior part of distal margin dorsally, with a smaller one below it, propodus with 3 strong spines proximally on lower margin, and 2 moderately strong ones distally, auxiliary claws about half length of main claw. Genital pores ♂ at apices of rounded processes on ventral apices of 2nd coxae of last 2 legs; in ♀

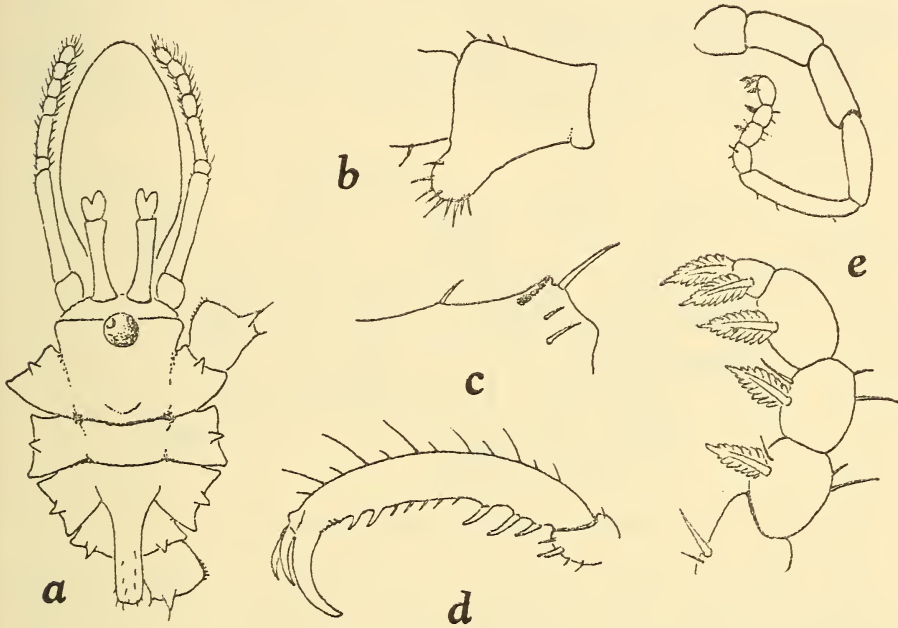


Fig. 24. *Achelia quadridentata* (Hodgson). a. dorsal view (4th joint of palp foreshortened). b. lateral view of 2nd coxa of last leg ♂. c. apex of femur with cement gland ♂. d. propodus and claws of leg. e. oviger ♂ with distal joints further enlarged.

on all legs, but not on projections. Femoral cement gland ♂ small, behind the dorsal apical spine.

Body incl. abdomen 1.5, proboscis 1.5 mm.

Localities: Lüderitzbucht (Hodgson); St. James, False Bay, littoral. 1 ovig. ♂, 1 ♀ (K. H. Barnard, 1912); Table Bay, 5 fath. (University Cape Town Ecol. Surv.).

Remarks. The above description of the St. James's specimens covers that given by Hodgson, and I think the identification of these specimens is correct. Hodgson's specimens had 4 proximal spines on the propodus; the present specimens have only 3.

Achelia brevicauda (Loman)

1904. Loman, *Zool. Jahrb. Abt. Syst.*, xx, p. 376, pl. 14, figs. 1-4 (♂)

Body compact, widest in front (but not so wide as in *quadridentata*), antero-lateral angles of cephalic segment subacutely angular (Loman: a strong conical tubercle), segments 3 and 4 fused, abdomen not marked off by a suture. Crurigers contiguous, a double setiferous tubercle (or two separate tubercles) at each antero-distal and postero-distal corner dorsally. Proboscis nearly as long as body, fusiform. Ocular tubercle on front margin of cephalic segment, rounded or bluntly pointed apically, eyes distinct. Abdomen short, extending to end of last crurigers.

Chelifer, palp and oviger as in *quadridentata* (cf. fig. 24). The 6th joint of oviger has a strong recurved spine proximally, as in *A. langi* Dohrn (1881, pl. 5, fig. 2).

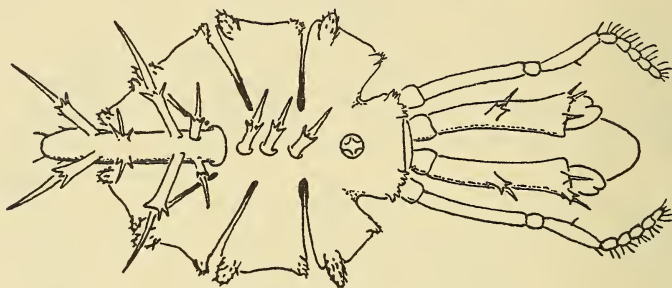


Fig. 25. *Nymphopsis cuspidata* (Hodgson).

Legs without prominent processes, 1st coxa with 2-3 setiferous conical tubercles on both antero- and postero-distal corners dorsally, distal corners of 2nd and 3rd coxae each with 1-2 much smaller and inconspicuous tubercles, femur with 2 major spines and an apical one on upper margin, propodus with 3 strong spines on lower margin proximally and 2-3 less strong ones distally, auxiliary claws about half length of main claw. Genital pores ♂ on prominent ventral processes on last 2 legs. Femoral cement gland ♂ small, opening behind the apical spine (cf. fig. 24 c).

Body incl. abdomen 1.25, proboscis 1, 3rd leg without claw 3.75 mm.

Localities: Port Elizabeth. 1 non-ovig. ♂ (Loman); Sea Point, Cape Town. 1 non-ovig. ♂ (K. H. Barnard, 1914).

Remarks. The pinnate spines on the distal joints of the oviger are described as 'oak-leaf spines' (Loman, et auct.) and are figured by Loman as more or less of this shape. Both in this and the previous species, however, the general outline is ovate, the basal serrations or pinnae being much longer than the distal ones. Even Dohrn's figures (1881) do not do full justice to these spines.

Gen. *Nymphopsis* Hasw.

1885. Haswell, *Proc. Linn. Soc.*, N.S.W., ix, p. 1025.
 1908. Loman, loc. cit., p. 49.
 1920. Flynn, *Pap. Proc. Roy. Soc. Tasman.* for 1919, p. 83.
 1923. Loman, *Ark. Zool.*, xv, 9, p. 7.
 1928. id., *Tijdschr. Ned. Dierk. Ver.* (3), i, Af. 2, p. 39.
 1929. Flynn, *Mem. Queensl. Mus.*, ix, p. 256.
 1932. Gordon, loc. cit., p. 123.

Body compact, segments completely fused (the cephalic segment distinct in *denticulata* Gordon 1932). Crurigers separate. Ocular tubercle a short distance

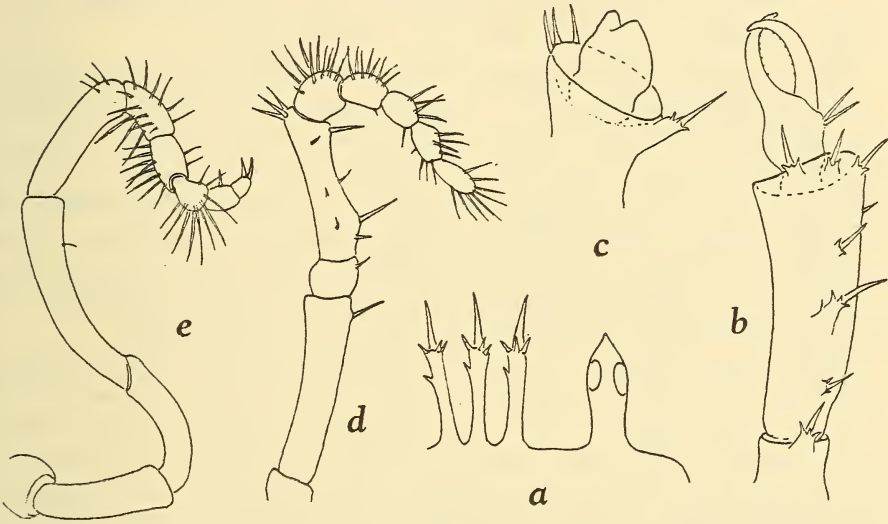


Fig. 26. *Nymphopsis cuspidata* (Hodgson). a. lateral view of ocular tubercle and dorsal spiniferous processes. b. chelifer of immature example. c. apex of scape and degenerate chela of adult. d. palp. e. oviger ♂.

behind front margin of cephalic segment. Proboscis large, fusiform, directed forwards. Abdomen with 2 pairs (genotype *armata*) or 4 pairs of spinose processes. Chelifer with 1-jointed (genotype *armata*) or 2-jointed scape, apex more or less cup-like, into which the small terminal joint can be withdrawn, in adult the latter is a feebly bifid joint, but in juvenile is a functional chela. Palp 9-jointed, 2nd and 4th joints longest. Ovipositor 10-jointed, in both sexes, distal joints with long spine-setae, but no serrate spines (except *denticulata* Gordon), without apical claw.

Legs moderate, tarsus small, propodus strongly spinose on lower margin, claw strong, auxiliary claws well developed, or feebly, or absent. Genital pores on all legs in ♀ on short projections; in ♂ on long curved processes on last

2 legs. Femoral cement gland ♂ single, opening near dorsal apex. Eggs in several packets.

Remarks. The distribution of this curious and easily recognized genus embraces Australia, East Indies, Japan, Venezuela, Falkland Islands and South Africa.

The body, abdomen, chelifers and legs are armed with spiniferous processes and/or branched or pinnate spines.

Nymphopsis cuspidata (Hodgson)

Figs. 25-27

1910. Hodgson, *Schultze. Reise*, iv, p. 221, fig. 1 (juv.). (*Ammothea c.*)

1923. Loman, loc. cit., p. 7, fig. D (♂). (*N. abstrusus*.)

Body together with the crurigers broadly oval in outline, in mid-dorsal line 3 elevated spiniferous processes. Cephalic segment with a spinose tubercle, sometimes more or less divided, on each antero-lateral corner. Crurigers longer than median width of body, contiguous, each with 2 spinose tubercles dorsally, one on antero-distal corner and a much larger and upstanding one on postero-distal corner. Proboscis shortly fusiform. Ocular tubercle high, cylindrical, tapering above the eyes to a conical point. Abdomen long, slender, with 4 pairs of spiniferous processes dorso-laterally, of which the 2nd and 4th pairs are the largest, 2 small spines on apex, and 1-2 laterally.

Chelifer scape 2-jointed, 1st joint with a spiniferous process on dorsal apex, 2nd joint with 3 such processes of which the middle one is the largest, and 2-3 on distal margin, hand of chela in juv. with 2 spines, finger and thumb curved, inner margins with minute spaced denticles, in adult chela degenerate, represented by a feebly bifid non-spinose joint. Palp with a few long spines on 4th joint, and numerous long spines on 5th-9th joints. Oviger with long spines on 6th-8th joints, 9th joint with a single spine, 10th joint with 2 spines.

Legs with spiniferous processes arranged mostly in pairs or 2 series dorso-laterally, most numerous on 1st and 2nd tibiae; 1st coxa with a stout spiniferous upstanding conical tubercle (like the postero-distal one on cruriger) medio-dorsally; 2nd coxa with ventral apex moderately protuberant on all legs in ♀, produced in a cylindrical process on first 2 legs in ♂ with long spine-setae all around its apex; produced in a long curved process on last 2 legs in ♂ with long spine-setae only on the surface facing away from the body, the apex (with genital pore) minutely spinulose; femur slightly longer than 1st tibia, and latter slightly longer than 2nd tibia; propodus slightly curved, with spaced single spines on upper margin, lower margin with stout spines of which the 3 proximal ones are very strong and prominent, claw strong, auxiliary claws stout, about half length of main claw. Femoral gland ♂ lying along dorsal surface of femur immediately under the cuticle, and opening between 2 simple spines near apex.

Body and abdomen each about 1.5, proboscis 3, leg (without claw) 7.5 mm.

Localities: Lüderitzbucht (Hodgson); Cape Point Lighthouse (Loman); Sea Point, Cape Town, littoral (K. H. Barnard, 1912, 1914, 1919); False Bay, 12 fath.; Port Elizabeth, East London (S. Afr. Mus.).

Remarks. There can be no doubt that Loman's specimen is the adult of Hodgson's species, who stated that both his specimens were immature. As Hodgson said, the spinose nature of the animal was sufficiently characteristic to justify describing a new species even on such material.

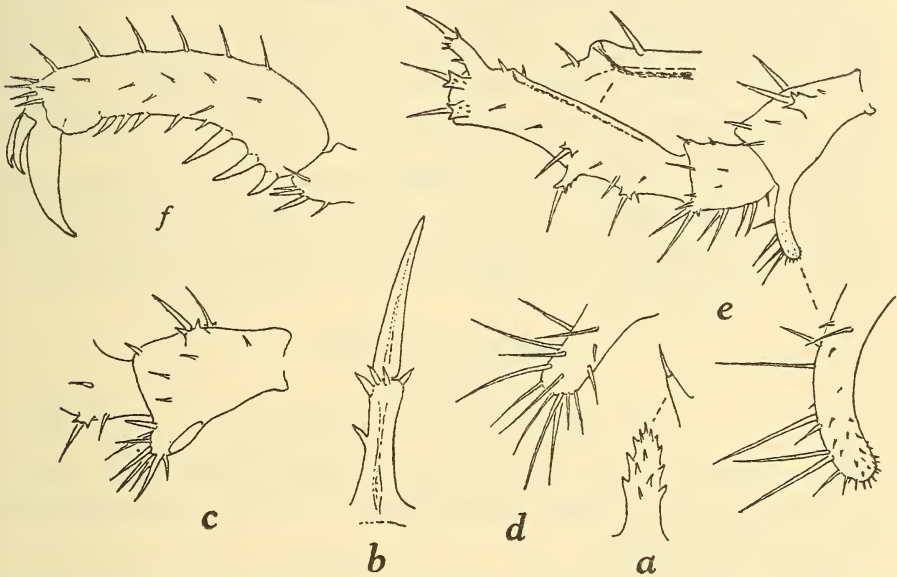


Fig. 27. *Nymphopsis cuspidata* (Hodgson). a. spine from cruriger and dorsal surface of 1st coxa. b. pedunculate spine from leg. c. lateral view of 2nd coxa of leg ♀. d. apex of 2nd coxa of 1st and 2nd legs ♂. e. 2nd and 3rd coxae and femur of 4th leg ♂, with apex of 2nd coxa, and femoral cement gland further enlarged. f. propodus and claw of leg.

He correctly remarked that the 'branched' spines were really cuticular prolongations bearing one or more movable spines. They should not be called 'compound spines' (Loman) or 'pinnate spines' (Flynn), at least not in this species; in *korotnewi* Schimk. the armature of the legs does appear (Loman, 1908. loc. cit., pl. 13, fig. 179) to be composed of pinnate spines.

The spiny armature of the animals collects much foreign matter; unencumbered specimens are rare, and dirty ones are difficult to clean.

Loman described the proboscis as 'slender', but this adjective is scarcely applicable to the present specimens.

The ♀ from False Bay has the proboscis shorter than the chelifers and quite invisible in dorsal view; also the medio-dorsal processes on the body are very much elevated, their height (excluding the apical spine) almost equal to the length of the abdomen.

Recent collecting (1946, 1947) by the Zoology Department of the University of Cape Town shows that this species is fairly common in shallow water in some places in False Bay.

Gen. *Kyphomia* Helfer

1938. Helfer, *SB. Ges. Naturf. Fr. Berlin*, 1937, p. 179.
1953. Stock, *Beaufortia*, iv, no. 35, p. 41.

Body compact, last two segments fused. Crurigers widely separated. Ocular tubercle near front margin of cephalic segment, slender, elongate. Chelifer with well-developed scape, and rudimentary 2nd joint. Palp 9-jointed, 2nd and 4th joints longest. Oviger 10-jointed, with a few serrate spines, no apical claw. Legs moderate, tarsus small, propodus spinose on lower margin, claw strong, auxiliary claws as long as main claw.

Remarks. Stock (1953) states that Helfer's types of this species have been lost, but from its likeness to an East Indian species he is convinced that Helfer's species should be included in the genus *Ammothella* (1900. Verrill, *Tr. Conn. Ac. Sci.*, x, p. 581, as subgen. of *Ammothea*: palp 10- instead of 8-jointed).

Kyphomia setacea Helfer

Fig. 28a

1938. Helfer, loc. cit., p. 179, fig. 9 a-c.

Body covered with small warts. Crurigers about equal to median width of body. Proboscis ovoid. Ocular tubercle longer in ♀ than in ♂, eyes pigmented. Abdomen slender, clavate.

Chelifer with 1-jointed scape, 2nd joint knob-like with 2 apical points. Oviger with a few setae and serrate spines on last 4 joints (2-3 serrate spines on last joint).

Legs with numerous long and short setae, femur in ♀ swollen, in ♂ nearly cylindrical, auxiliary claws as long as main claw. Femoral gland ♂ opening at apex of a slender process at end of femur.

Length 3 mm., span 6-7 mm.

Locality: Agulhas Bank, 35° 19' S. 20° 12' E., 126 metres (Helfer).

Gen. *Ainigma* Helfer

1938. Helfer, loc. cit., p. 181

Body compact, segmented. Crurigers widely separated. Ocular tubercle near front margin of cephalic segment, high. Chelifer with well-developed scape and rudimentary 2nd joint. Palp 9-jointed, 2nd and 4th joints longest. Oviger 10-jointed, apical joints with small serrate spines, terminal joint non-serrate. Legs moderate, tarsus one-third length of propodus, which is non-spinose, claw as long as propodus, no auxiliary claws.

Remarks. Hedgpeth (1947. *Smiths. Misc. Coll.*, cvi, p. 4) accepts and places this genus in the *Ammotheidae*. Stock (1952. *Bull. Inst. Roy. Sci. Nat. Belge*, xxviii, 14, p. 5; and 1953. loc. cit. *infra*) considers it a synonym of *Ascorhynchus*.

A species of *Ascorhynchus* (*A. glaber* Hoek, 1881) was collected by H.M.S. *Challenger* between the Cape and Kerguelen ($46^{\circ} 46' S$. $45^{\circ} 31' E$., 1,375 fath.).

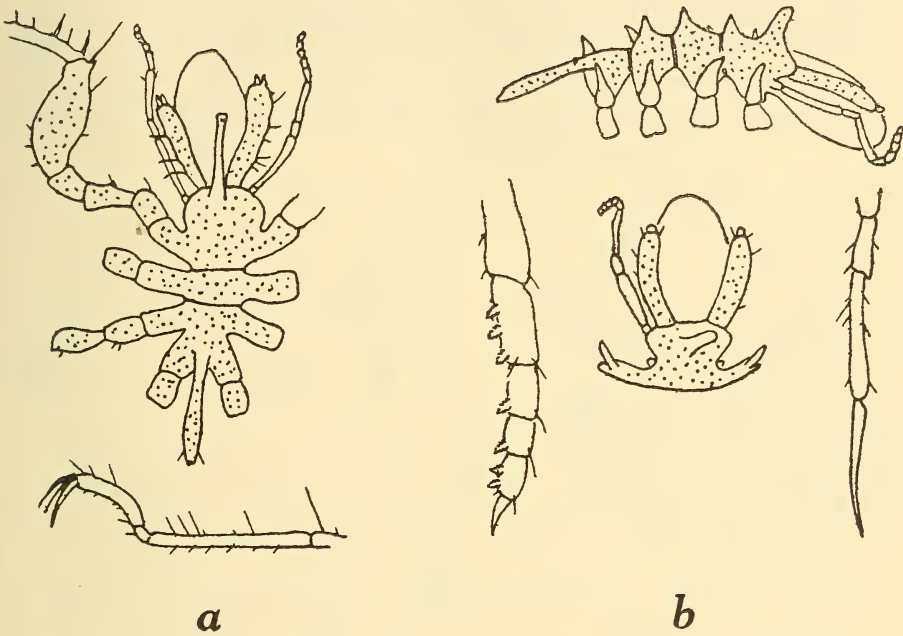


Fig. 28. a. *Kyphomia setacea* Helfer, ♀ with distal joints of leg. b. *Ainigma ornatum* Helfer, lateral view, dorsal view of cephalic segment, distal joints of oviger, and distal joints of leg. (After Helfer.)

Ainigma ornatum Helfer

Fig. 28b

1938. Helfer, loc. cit., p. 181, fig. 10 a-f.

1953. Stock, *Beaufortia*, vi, no. 35, p. 41, fig. 6. (*Ascorhynchus o.*)

1953. id., *Temminckia*, ix, p. 304 (in key to species).

Body covered with small warts, each segment with a conical medio-dorsal process. Crurigers about equal to median width of body, each with a conical upstanding process. Proboscis ovoid. Abdomen slender, clavate. Chelifer with 1-jointed scape, 2nd joint knob-like.

Length 2.88 mm.

Locality: Agulhas Bank, $35^{\circ} 19' S$. $20^{\circ} 12' E$., 126 metres (Helfer).

Gen. *Austroraptus* Hodgson

1907. Hodgson, *Nat. Antarct. Exp.*, iii, p. 54.
 1915. Calman, '*Terra Nova*' *Exp. Rep.*, iii, p. 62.
 1927. Hodgson, *D. Südpol Exp.*, xix (zool. xi), p. 349.
 1932. Gordon, '*Discovery*' *Rep.*, vi, p. 114.
 1944. id., *B.A.N.Z. Antarct. Res. Exp.*, v, p. 57.

Body compact, segments fused or only indistinctly demarcated. Crurigers narrowly separated or contiguous. Proboscis flask-shaped, stout at base, narrowing to a point, directed or curved downwards. Chelifers small, chelate, rudimentary. Palp 6-jointed, the apical joint inserted laterally on the 5th and

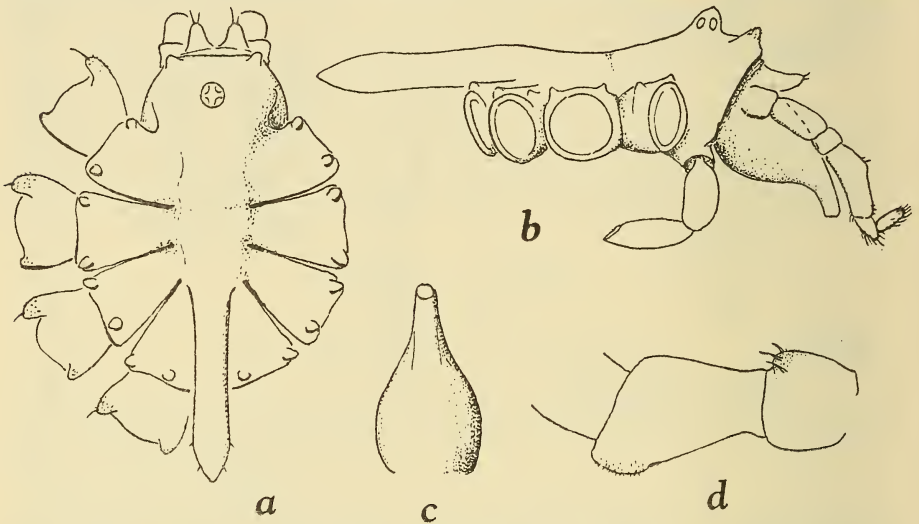


Fig. 29. *Austroraptus thermophilus* Brnrd. a. dorsal view (palp bent downwards). b. lateral view. c. ventral view of proboscis. d. 1st and 2nd coxae of 4th leg ♂.

projecting forwards or upwards (the apical joint may be tripartite). Oviger 10-jointed, in both sexes, apical joints with simple non-serrate spines, no apical claw. Legs moderate, tarsus short, auxiliary claws moderate, small, or minute.

Remarks. Previously known only from the Antarctic (3 species); the discovery of a species in the considerably warmer waters of South Africa is noteworthy.

Appears to differ from the species of *Tanystylum* with 6-jointed palps only in the shape of the proboscis.

Austroraptus thermophilus Brnrd.

Figs. 29, 30

1946. Barnard, *Ann. Mag. Nat. Hist.* (xi) 13, p. 62.

Body compact, all the segments fused, smooth; cephalic segment broad with a tubercle at each antero-lateral corner. Crurigers contiguous, their

length greater than median width of segments, each with a tubercle on antero-distal and postero-distal corners dorsally, a little more prominent in ♂ than ♀. Ocular tubercle conical, rather broad and low, eyes distinct. Proboscis markedly flask-shaped, broad proximally, rapidly narrowing to a downwardly curving apex. Abdomen elongate, extending beyond end of 1st coxa of last leg, horizontal.

Chelifers vestigial, composed of a single conical projection with 2 apical setules, less prominent in ♀ than in ♂. Palps robust, curving downwards, 4th

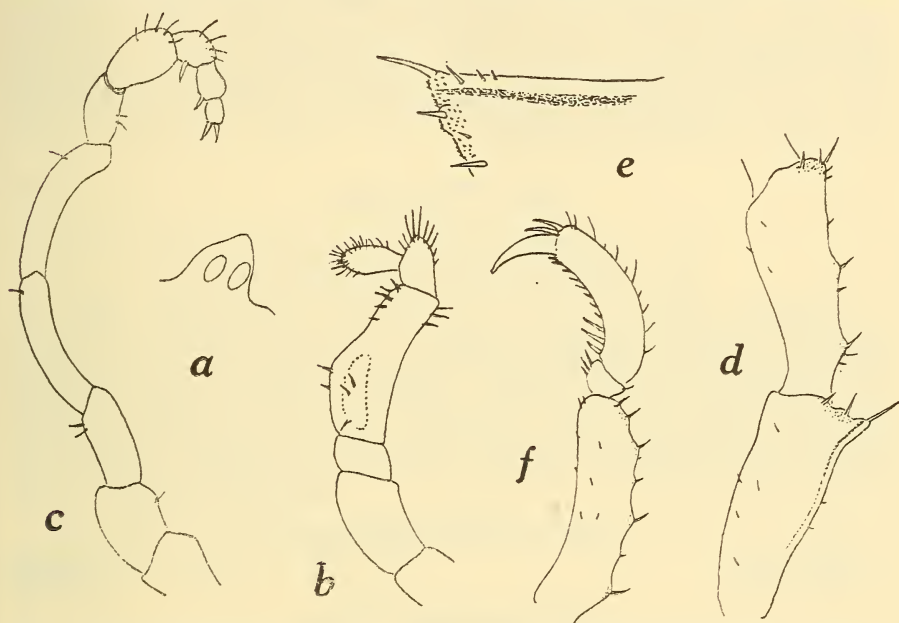


Fig. 30. *Austroraptus thermophilus* Brnrd. a. ocular tubercle from right side. b. palp. c. oviger ♂. d. femur and 1st tibia of leg ♂. e. apex of femur with cement gland ♂. f. distal joints of leg.

joint longest, angular in middle of upper margin, a pale or semitransparent oval spot indicating a gland (but orifice not traceable), 5th joint conical, setose, 6th ovate, inserted laterally on 5th and projecting forwards and upwards, setose. Ovipositor in ♂ with 4th and 5th joints gently curved, distal joints feebly armed, 8th and 9th each with a simple spine on inner margin, 10th joint with 2 apical spines; in ♀ similar but shorter and weaker, 4th and 5th joints straight.

Legs 1st coxa with the antero-distal and postero-distal corners produced in a tubercle, the anterior one larger than the posterior and carrying 1 or 2 spines, both tubercles are more prominent in ♂ than in ♀; 2nd coxa with lower apex slightly but not prominently gibbous, genital pores in ♀ on all legs, in ♂ only on last two; femur with upper apex produced, 1st and 2nd tibiae subequal (and subequal to femur) with low rounded spiniferous tubercles arranged more or less in 2 longitudinal dorso-lateral series; propodus with 3 large spines proximally on lower margin, auxiliary claws well developed, nearly half length of

main claw. Femoral cement gland ♂ single, elongate, lying immediately below the cuticle, opening on distal surface of the apical projection.

All the tubercles on the cephalon, crurigers and 1st coxae, and the nodulosities on the legs are microscopically hispid.

Body incl. abdomen 3 (trunk and abdomen subequal), proboscis 1.25, leg without claw 8 mm.

Localities: False Bay, 23 fath. 1 ♀; off Cape St. Blaize, 34 fath. 1 ovig. ♂; off Nanquas Peak (east of Algoa Bay), 63 fath. 2 non-ovig. ♂♂ (S. Afr. Mus.).

Remarks. Distinguished from the genotype *polaris* by the contiguous crurigers, and from all the three Antarctic species by the longer abdomen and more markedly flask-shaped proboscis, shorter ocular tubercle, shorter tubercles on 1st coxae, and the distinct though not prominent nodulosities on the tibiae; the auxiliary claws also are stronger.

Fam. TANYSTYLIDAE

1913. Schimkewitsch, *Zool. Anz.*, xli, p. 613.

1947. Hedgpeth, *Smiths. Misc. Coll.*, cvi, p. 4.

Octopodous. Body compact, segments fused or segmentation visible only laterally. Crurigers narrowly separated or contiguous, or fused. Proboscis large, fusiform, directed forwards. Chelifers absent in adult, sometimes rudiments in juvenile. Palps 4-6-jointed. Ovigigers in both sexes, 10-jointed, without compound spines. Legs stout, tarsus very short, auxiliary claws present. Genital pores on all legs in ♀, on last 2 in ♂. Eggs in several masses.

Key to the South African Genera

1. Palp 6-jointed.
2. Palp 5-jointed.

Tanystylum
Discoarachne

Gen. *Tanystylum* Miers

1879. Miers, *Philos. Trans. Roy. Soc. Lond.*, clxviii, p. 213.

1932. Gordon, *Ann. Mag. Nat. Hist.* (10), x, p. 87.

1932. id., *'Discovery' Rep.*, vi, p. 117.

Body subcircular, unsegmented. Crurigers narrowly separated or contiguous, or fused. Proboscis stout, movable, directed forwards. Palp 6-jointed.

Key to the South African [incl. Tristan d'Acunha] species

1. Crurigers fused.
2. Crurigers separate.

ornatum
[*hofferi*]

Tanystylum ornatum Flynn

1928. Flynn, loc. cit., p. 33, figs. 20, 21.

Crurigers fused, the divisions between them indicated by superficial markings; each cruriger with a pair of knobs distally on dorsal side. Ocular tubercle moderately high, rounded, surmounted by a short pointed process. Proboscis ovoid. Abdomen clavate, oblique.

Chelifers represented by a pair of small setose processes. Palp 4th joint longest, 2nd and 6th subequal. Oviger in ♂ 4th joint curved, 5th longest, 8th at right angles to 7th, 10th with 2 apical spines; in ♀ (as figured by Flynn) 4th and 5th joints subequal, 6th-9th joints each with 1 spine on outer apex, 9th also with 2-3 spines on inner apex, 10th joint with 2 apical spines.

Legs 1st coxae ending in 2 or more lobes dorsally, the three coxae subequal, femur and tibiae subequal, propodus without heel.

Body with proboscis, excl. abdomen 1.8 mm.

Locality: off west coast of Cape Peninsula, 25-30 fath. (Flynn).

Remarks. The oviger as represented in fig. 21a as that of a ♀ seems rather remarkable, especially as regards the 10th joint with its 2 stout opposing spines (cf. *Discoarachne brevipes* ♂). It may be noted that the latter species was taken in the same locality together with the *Tanystylum* specimens.

Gen. *Discoarachne* Hoek

1881. Hoek, *Rep. H.M.S. 'Challenger'*, iii, p. 74.

1901. Cole, *Zool. Jahrb. Abt. Syst.*, xv, pp. 243 sqq.

1904. Loman, *ibid.*, xx, p. 383.

1908. *id.*, *Siboga Exp. monogr.*, xl, pp. 14 sqq. and synopsis facing p. 19.

Resembling *Tanystylum* but palp 5-jointed. Genital pores in ♂ on last 2 legs, in ♀ on all legs. Femoral cement gland ♂ a single pore near dorsal apex.

Remarks. Loman (1904) erroneously stated that the crurigers were fused, and that the ♂ oviger was 9-jointed. The latter statement was corrected by him in 1923 (*loc. cit. infra*).

The genus is sometimes regarded (1909. Thompson, *Cambr. Nat. Hist.*, iv, p. 535) as a subgenus of *Tanystylum*.

Discoarachne brevipes Hoek

Fig. 31a, b

1881. Hoek, *loc. cit.*, pp. 74, 105, pl. 7, figs. 8-12.

1901. Cole, *loc. cit.*, p. 243, pl. 13.

1904. Loman, *loc. cit.*, p. 379, pl. 14, figs. 7-11.

1908. *id.*, *loc. cit.*, p. 46 (incidentally mentions 'commensals' [? Rotifers] on the palps).

1910. Hodgson, *Schultze. Reise*, iv, p. 227.

1923. Loman, *Ark. Zool.*, xv, 9, p. 6, fig. C.

1928. Flynn, *loc. cit.*, p. 35.

1951. Stock, *Mem. Inst. Roy. Sci. Nat. Belge* (2) fasc. 43, p. 3.

Body oval, crurigers distinct and not fused though separated only by clefts. Proboscis somewhat fusiform. Ocular tubercle low, rounded, eyes distinct. Abdomen extending to end of last crurigers, rather slender, clavate, horizontal.

Chelifers represented in young specimens by 2 small setiferous processes, sometimes 2-jointed (Loman, 1904, fig. 7a); in older specimens these tiny

stumps may be retained, but as often as not no trace of the chelifers is found. Palp slender, with first 2 joints short, 3rd longest, often swollen, 4th short. Oviger in ♂ with 8th joint attached at right angles to 7th, 10th with 2 apical and rather stout spines simulating a minute chela; in ♀ normal, 10th joint longer than 9th, with several apical spines.

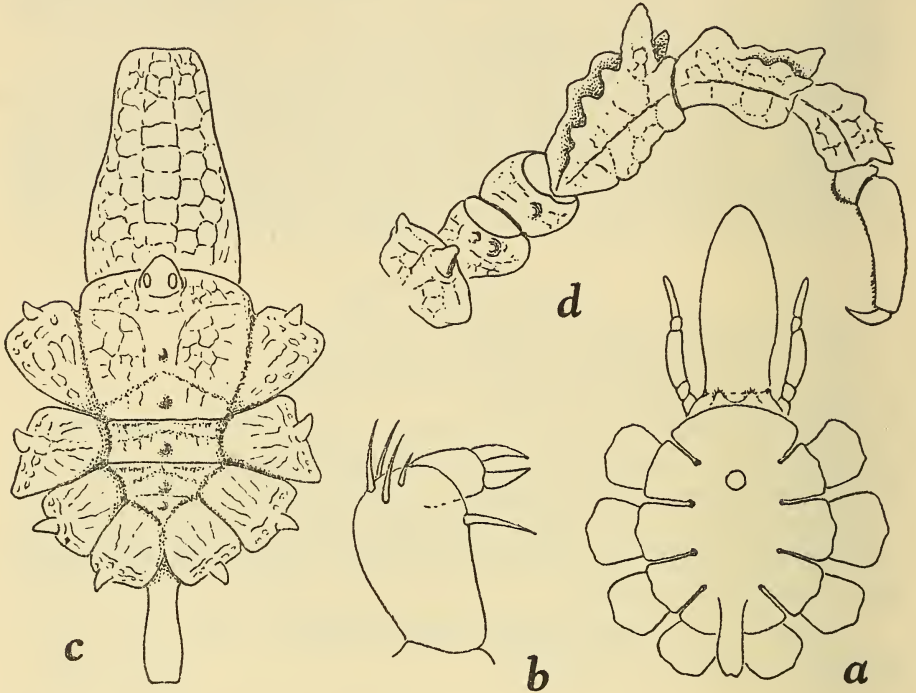


Fig. 31. *a, b.* *Discoarachne brevipes* Hoek, dorsal view, and 9th and 10th joints of oviger ♂. *c, d.* *Pycnogonum forte* Flynn, dorsal view with 3rd right leg to same scale (coxae in dorsal view, remainder of leg in postero-lateral view).

Legs stout, the three coxae subequal, femur somewhat contorted, tarsus much narrower than 2nd tibia, propodus with 3 stout spines at base but no distinct heel. Very minutely hispid. Femoral cement gland ♂ single, near the apex on dorsal surface.

Body (tip of proboscis to tip of abdomen) 4·4·25 mm.

Localities: Cape Town, littoral (Hoek, Cole, Loman, Flynn); off west coast of Cape Peninsula, 25-30 fath. (Flynn); Cape Point Lighthouse, littoral (Loman); False Bay (probably littoral) (Hodgson); Port Natal (Durban) (Loman); Lüderitzbucht (Stock); Port Nolloth, Saldanha Bay, Table Bay, west and east coasts of Cape Peninsula, Kleinmond (mouth of the Palmiet River, Cape Province), Plettenberg Bay, East London, all littoral (S. Afr. Mus.).

Remarks. This is a very common Pycnogonid on both sides of the Cape Peninsula among weeds, Hydroids, anemones, etc., between tide marks.

Ovigerous ♂♂ have been collected in February, July and September to November; probably breeding occurs throughout the year.

Stock's record is presumably based on the 'Mercator' collections, although he makes no mention of this species in the systematic part of his paper. The specimens collected by Dr. Schultze, and recorded by Hodgson, came from False Bay, not from Lüderitzbucht.

Fam. PYCNOGONIDAE

1908. Loman, *Siboga Exp. monogr.*, xl, conspectus facing p. 19.
 1909. Thompson, *Cambr. Nat. Hist.*, iv, p. 539.
 1913. Bouvier, *2me Exp. Antarct. Franc.*, pp. 46, 149.
 1927. Calman, *Trans. Zool. Soc. Lond.*, xxii, pp. 408, 410.
 1947. Hedgpeth, *Smiths. Misc. Coll.*, cvi, p. 5 (in list of families and genera).

Decapodous (*Pentapycnon*) or octopodous. Body segmented or the segmentation more or less suppressed. Proboscis projecting forwards or more or less bent under body. Chelifers reduced or absent, if present either chelate in adult or only in juvenile. Palps usually absent. Ovigers present in ♂ only, 6-9-jointed, with apical claw, but no spines. Legs without auxiliary claws (sometimes vestiges). Genital pores on last leg only in both sexes. Eggs in a single cake-like mass.

Remarks. Several genera which are in one respect or another aberrant have been associated with the genus *Pycnogonum* in this family.

Gen. *Pycnogonum* Brün.

1764. Brünnich, *Entomologia*, p. 84.
 1881. Dohrn, *F. Fl. Golf. Neapel*, iii, p. 202.
 1902. Möbius, *D. Tiefsee Exp.*, iii, p. 193.
 1908. Loman, loc. cit., pp. 5-9, conspectus facing p. 19 and p. 34.
 1913. Bouvier, loc. cit., pp. 150, 156.
 1922. id., *Ann. Sci. Nat. Zool.* (10) v, p. 113.

Octopodous. Body with segments 3 and 4 often close together and junction difficult to trace, or fused. Crurigers separate or contiguous. Proboscis movable, stout. Chelifers absent (but see: *P* (?) *claudum* Loman, 1908). Palps absent. Ovigers in ♂ only, sometimes absent even in ovigerous specimens. Legs with auxiliary claws vestigial or absent. Genital pores on 2nd coxa of last leg in both sexes, in ♀ on dorsal surface, in ♂ on ventral surface.

Remarks. Dohrn (loc. cit., p. 203) stated that the genital pores in ♀ were dorsal, and this applies to his *pusillum*; but in his *nodulosum* he described them as being ventral, albeit near the posterior margin.

Key to the South African Species

- I. No auxiliary claws.
 A. Junction of 3rd and 4th segments not evident, these two segments more or less fused. Crurigers contiguous.

1. 2nd tibia at least half length of 1st tibia. Proboscis cylindrical.
 a. 4 medio-dorsal tubercles (only 1 on cephalic segment). *cataphractum*
 b. 5 medio-dorsal tubercles (2 on cephalic segment). *forte*
 2. 2nd tibia scarcely one-third length of 1st tibia. Proboscis tapering. *portus*
 B. 3rd and 4th segments quite distinct, and all crurigers separate. Ocular
 tubercle very small. *microps*
 II. Small auxiliary claws present. *pusillum*

Pycnogonum cataphractum Möbius

1902. Möbius, loc. cit., p. 194, pl. 30, fig. 11.

Integument reticulate. Body stout, cephalic segment wider than following segments, all of which are (according to the figure) distinct; 4 medio-dorsal conical tubercles, one on each segment. Crurigers contiguous, each with a conical boss or process on dorsal apex. Ocular tubercle conical, rounded, shorter than the tubercle behind it, eyes distinct. Proboscis stout, somewhat narrowed in distal half, apex truncate. Abdomen extending slightly beyond last crurigers, apically truncate.

Legs with conical or digitiform processes, one on dorsal apex of 1st coxa, 4-5 on femur, 1-2 on 1st tibia, 1 on 2nd tibia, tibiae subequal, each slightly shorter than femur, claw one-third length of propodus (drawn too long in the figure), no auxiliary claws.

Smaller specimen: body 9, proboscis 4, abdomen 1 mm.; larger (incomplete) specimen; proboscis 5 mm.

Locality: St. Francis Bay, shallow water (Möbius).

Remarks. *P. tumulosum* Loman, 1908, East Indies, has somewhat similar nodose legs, but has 2 medio-dorsal tubercles on cephalic segment and none on 4th segment.

The smaller of the 'Valdivia' specimens had eggs attached to the ventral surface but no ovigers.

Pycnogonum forte Flynn

Fig. 31c, d

1928. Flynn, loc. cit., p. 31, figs. 18, 19 (♀).

Very close to *cataphractum*. Third and 4th segments fused, last pair of crurigers fused; 5 medio-dorsal, more or less digitiform, tubercles of which 2 are on cephalic segment and one on each of the other segments. Abdomen longer, extending considerably beyond last crurigers.

Legs in holotype less conspicuously tubercular than in *cataphractum*. In the present specimen the legs are conspicuously tubercular; a conical tubercle on upper apex of 1st coxa, 1 or 2 low rounded tubercles dorsally on both 2nd and 3rd coxae; on femur 2 rows of rounded tubercles increasing in size distally, with a large conical tubercle between the apical pair; 1st tibia with a large tubercle near base followed by 2 rows of rounded tubercles; 2nd tibia similar, but the tubercles less prominent; propodus feebly granulose on upper surface, finely setulose on lower margin, claw about one-third length of propodus,

auxiliary claws absent. Genital pores in present specimen on *dorsal* surface of 2nd coxa of last leg.

Total length 10.5 mm., proboscis 5 mm., abdomen 2 mm. (Flynn's specimen resp. about 10.3, 3.8, 1.5).

Localities: off Gneka River*, 1 ♀ (Flynn); off Great Fish Point, 49 fath. 1 ♀ (S. Afr. Mus.).

Remarks. This species is so extraordinarily like *cataphractum* that, when more material is available, it will probably be found to be conspecific.

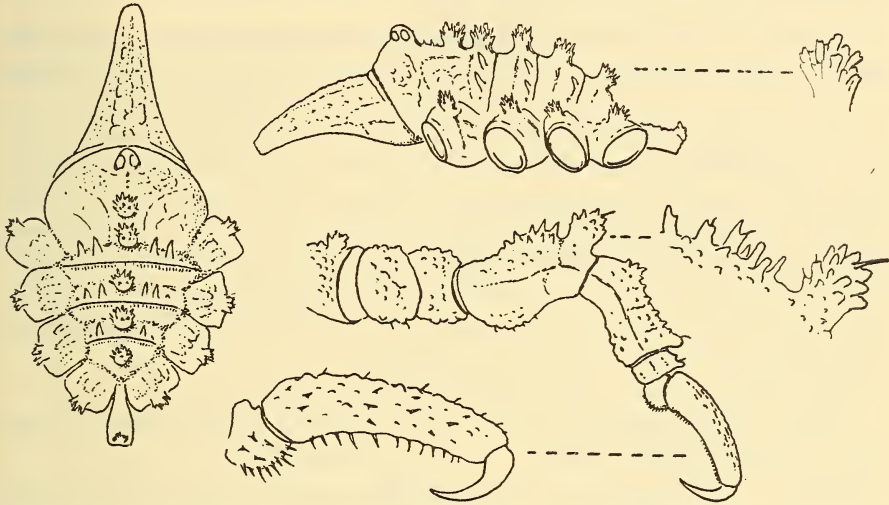


Fig. 32. *Pycnogonum portus* Brnrd. Dorsal view; lateral view, with process further enlarged; lateral view of leg, with dorsal surface of femur, and tarsus and propodus further enlarged.

Möbius may possibly have overlooked the 2nd tubercle on the cephalic segment, but however that may be the longer abdomen in *forte* seems to be a definite differential character, unless it be sexual.

Flynn's figure gives the impression of shallow depressions between the crurigers and the body proper; in the present specimen they are much deeper. And though the 4th segment is fused with the 3rd the suture is visible dorsally.

The present specimen has a very small and indistinct granule on the hinder slope of the ocular tubercle.

Pycnogonum portus Brnrd.

Fig. 32

1946. Barnard, *Ann. Mag. Nat. Hist.*, (xi) 13, p. 62.

Integument reticulate. Body stout, cephalic segment very broad, following segments rapidly decreasing in width, junction of 3rd and 4th difficult to trace dorsally; 5 medio-dorsal tubercles, 2 on cephalic segment, one on each of the other segments, each tubercle ornamented with a number of minute conical

* See p. 85 footnote.

or digitiform processes. Near hind margin of cephalic and of 2nd segment 2 conical tubercles on either side of the medio-dorsal tubercle, and on 3rd segment one similar tubercle flanking the medio-dorsal one; several additional minute granules or projections, resembling those on the medio-dorsal tubercles, scattered over the integument. Crurigers contiguous, each with an ornamental tubercle on upper apex. Ocular tubercle rather low, rounded, eyes distinct. Proboscis stout at base, rapidly tapering to a narrowly truncate apex. Abdomen extending beyond last crurigers, ornamented like the medio-dorsal tubercles and with a small tubercle on dorsal apex.

Legs stout, nodulose and granulose with granular and digitiform outgrowths similar to those on body, 1st coxa with a tubercle on dorsal apex, femur rather strongly convex on proximal ventral surface and on distal dorsal surface, on the latter several outgrowths of various shapes, some bearing a spinule, and also a large prominent tubercle on apex, 1st tibia a little shorter than femur, with a low tubercle or boss proximally on dorsal surface, and numerous outgrowths, 2nd tibia very short, scarcely one-third length of 1st tibia, tarsus spinulose on lower surface, propodus slightly tapering, granulose, with spinules on lower margin, claw about one-third length of propodus, no auxiliary claws.

Genital pores on dorsal surface of 2nd coxa of last leg in ♀; not traceable on the ovigerous specimen which is presumably a ♂.

Total length 3.5 mm., body plus abdomen 2.75 mm.

Locality: Port Elizabeth, littoral. 1 ♀, 1 ovigerous ♂ (University of Cape Town Ecological Survey, 1936).

Remarks. The integumentary ornamentation, and the shortness of the 2nd tibia are the noteworthy features of this species.

Remarkable also is the complete absence of ovigers in the specimen which carries a flat cake-like mass of eggs. The eggs are loosely cemented to the ventral surface of the body, and the specimen is presumably a ♂, especially as no distinct and large genital pores, as are easily observed in the second specimen, can be traced.

So far as I am aware the absence of ovigers in ovigerous specimens had not been observed except by Möbius (1902, loc. cit.) in his description of *cataphractum*. Are the ovigers never developed in some species? Or does a male before he is fully developed (structurally and perhaps also sexually) have to carry as best he can the packet of eggs which a female may dump upon him?

Pycnogonum microps Loman

1904. Loman, *Zool. Jahrb. Abt. Syst.*, xx, p. 378, pl. 14, figs. 5, 6 (♀)

Integument reticulate and granulose. Body stout, the segments especially 3rd and 4th distinct, cephalic segment not greatly wider than the others; 4 medio-dorsal tubercles, two (a smaller anterior and a larger posterior one) on cephalic segment, and one on each of segments 2 and 3. Crurigers almost as long as their segments, not contiguous, each with a small tubercle near dorsal

apex. Ocular tubercle very small, eyes minute. Proboscis very stout, cylindrical, apex truncate. Abdomen extending slightly beyond ends of 1st coxae of last legs, apically truncate.

Legs stout, granulose but without tubercles or bosses; 2nd tibia nearly as long as 1st, no auxiliary claws.

Body 3, proboscis 1.5, abdomen .5 mm.

Locality: Illovo or Isipingo (Natal), littoral. 1 ♀ (Loman).

Remarks. Quite different from the other South African species in the form of the body.

Loman's figure 6, showing the body in profile, does not seem to correspond with fig. 5, as it shows only the smaller medio-dorsal tubercle on the cephalic

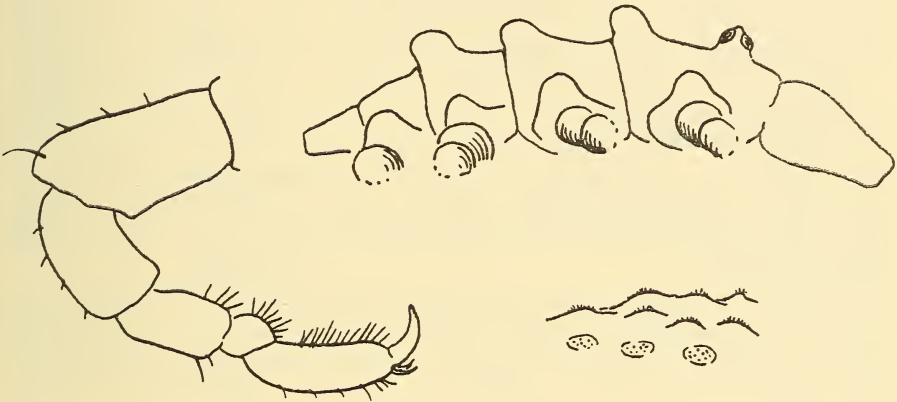


Fig. 33. *Pycnogonum pusillum* Dohrn. Lateral view; portion of integument; 1st leg.

segment, and a transverse ridge culminating in the median boss on *each* of the following segments. The intersegmental sutures seem to be wrongly indicated.

Pycnogonum pusillum Dohrn

Fig. 33

1881. Dohrn, *Fauna Flora Golf. Neapel.*, iii, p. 207, pl. 16, figs. 4-8.

1953. Stock, *Bull. Inst. Roy. Sci. Nat. Belge*, xxviii 14, pp. 1-3, and 5, fig. 1.

Integument with numerous, but scattered granules crowned with minute spinules. Body stout, segments distinct, cephalic segment not wider than the others; 3 medio-dorsal prominences, one each on the cephalic and the two following segments. Crurigers not contiguous, but angle of divergence between 2nd and 3rd greater than that between the others; each with a prominence near dorsal apex. Ocular tubercle as large as the body prominences, eyes well developed. Proboscis very stout, slightly tapering to the truncate apex. Abdomen extending slightly beyond end of 1st coxae of last legs, apically rounded. No ovigers.

Legs stout, granulose like the rest of the integument, without tubercles or bosses, but dorsal apex of femur somewhat gibbous; 2nd tibia nearly as long as 1st; auxiliary claws small but distinct. Genital pore not traceable.

Body 2, proboscis .75, abdomen .5 mm.

Locality: False Bay (Cape), 8 fath. (Univ. Cape Town Ecol. Surv., Aug. 1952, one specimen).

Distribution. Gulf of Naples (Dohrn); Santa Maria Bay, Angola (13° 25' S.). (Stock.)

Remarks. After its original description seventy years elapsed before this species was rediscovered; and then far away from its previously known habitat. It is strange that a couple of years later another example should be collected, and even farther afield. That is assuming that the identification of the present specimen is correct. There is no justification for a n.sp.; the single specimen can be compared only with *pusillum*, and only one feature requires comment.

Dohrn used the words 'beträchtlicher Höcker' and 'beträchtlicher Buckel' in describing the projections on the segments and crurigers, but unfortunately omitted to indicate these projections in his figure (as Stock pointed out). I would use a similar term, boss, projection or prominence, in preference to 'tubercle' for the present specimen. Stock, however, used the word 'tubercle', and his figure gives the impression that these prominences are in fact small and well-defined tubercles.

Dr. Stock, to whom a sketch of the Cape specimen was sent, considers that it should be identified as *pusillum*; and states that the ocular tubercle and body prominences are subject to considerable variation in the genus *Pycnogonum*.

INCERTAE SEDIS

Gen. *Queubus* Brnrd.

1946. Barnard, *Ann. Mag. Nat. Hist.* (xi) 13, p. 63.

Octopodous. Body distinctly segmented, anterior part of cephalic segment produced considerably in front of first crurigers. Proboscis movable, elongate, slender, tapering. Chelifers and palps absent. Oviger ♂ 10-jointed, with apical claw (♀ unknown). Legs strong, but of good length proportionately to body, 2nd coxa longer than either 1st or 3rd, tarsus short, propodus stout, with heel and strong spines on lower margin, claw strong, no auxiliary claws. Femoral pores on ventral apex of 2nd coxa of last 2 legs. Eggs carried in a single mass.

Remarks. Resembling *Pycnogonum* in the absence of chelifers and palps, but differing in the armature and subchelate shape of the propodus of the legs. The absence of the ♀ makes the position and relationships of the genus uncertain.

Pigrogromitus Calman, 1927, is another genus with some remarkable features and of uncertain position. The name of the present genus is taken from the same passage in Shakespear.

Queubus jamesanus Brnrd.

Fig. 34

1946. Barnard, loc. cit., p. 63.

♂ — In general resembling *Pycnogonum crassirostre*, but legs relatively longer. Integument smooth. Hind part of cephalic and 4th segments, and anterior part of 2nd and 3rd segments raised into a prominent conical boss. Crurigers

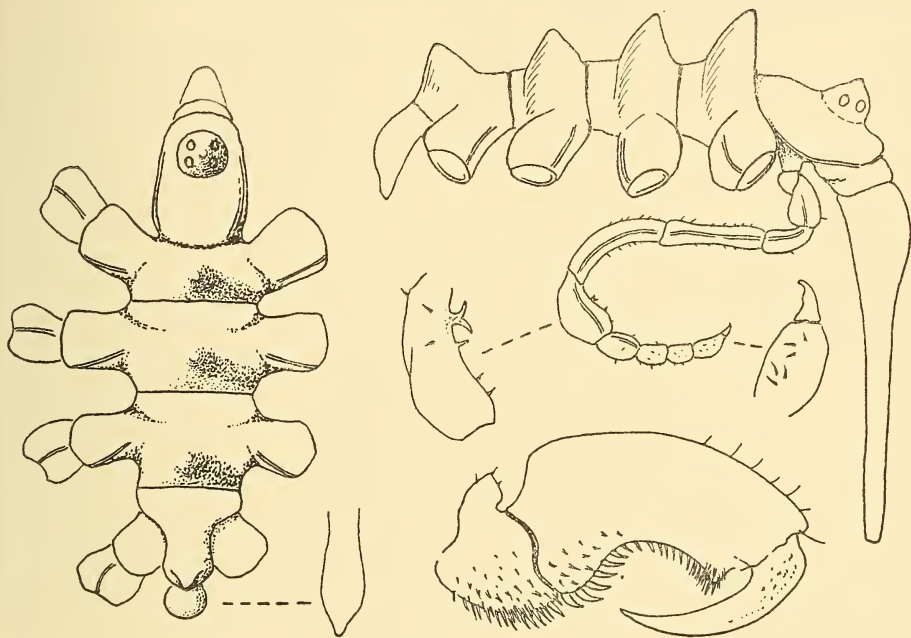


Fig. 34. *Queubus jamesanus* Brnrd. Dorsal view ♂ (gap between 3rd and 4th crurigers drawn too wide, abdomen foreshortened and drawn in true length alongside); lateral view, with oviger, 6th and 10th joints of latter further enlarged; tarsus, propodus and claw of leg.

separated by half to three-quarters their own width (gap between 3rd and 4th in the figure is too wide), their length less than median width of segments. Ocular tubercle large, conical, not very high, eyes distinct. Proboscis long, narrowing rapidly, the distal two-thirds slender, cylindrical. Abdomen deflexed, clavate, with pointed apex.

Oviger 10-jointed, 4th and 5th joints longest, 5th curved, 6th ovately expanded, inner margin with a strong bifid spine and a simple spine, 7th-10th joints with minute spinules, apical claw short.

Legs smooth, 2nd coxa longer than either 1st or 3rd, but not quite equal to the other two combined, femur subequal to the three coxae combined, 1st and 2nd tibiae subequal, each shorter than femur, tarsus strongly spinulose on

lower surface, propodus curved, with heel carrying 6-7 strong spines, with other spines on lower margin decreasing in size, lower apex angularly prominent, spinulose, claw strong, reaching to the heel on propodus, no auxiliary claws.

Base of proboscis to base of abdomen 4 mm., proboscis 3 mm., leg without claw 9 mm.

Locality: St. James, False Bay, low-tide. 1 ovig. ♂ (K. H. Barnard, 1912).

Remarks. The single mass of eggs was carried by the right oviger only, the left being folded up alongside.